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REPORT  
ON  
MEDICAL & HEALTH WORK  
IN  
THE SUDAN  
FOR THE YEAR  
1926.



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# REPORT

ON

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# SUDAN MEDICAL SERVICE.

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## ANNUAL REPORT

1926.

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## GENERAL REMARKS.

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The health of the Sudan as a whole has been satisfactory. The rains over the northern and central Sudan were below the average, and in consequence the general incidence of malaria has been correspondingly low. A serious epidemic of relapsing fever, causing a very heavy mortality, broke out in Darfur in September, 1926. This is referred to under the heading of "Epidemic Diseases."

Considerable further progress has been made with the policy of training subordinate medical staff, with the training of midwives, with founding dispensaries in centres of population which are out of reach of the provincial hospitals, and in dealing with certain endemic diseases.

Considerable initial difficulties have been encountered in preventing the breeding out of malarial mosquitoes in the irrigated area, owing to certain faults and inadequacies in the construction of many of the canals. It is hoped that these matters will be put right in the ensuing year. These questions are dealt with under "Sanitation, Gezirah."

Three additional nurses have been approved and engaged during the year. This enables nurses to be posted at Wad Medani for the whole year and at Port Sudan and Atbara during the winter months.

## EPIDEMIC DISEASES.

### (1) RELAPSING FEVER IN DARFUR.

Cases of relapsing fever were reported to have occurred in the Kebkebia district on September 11th, 1926 and a similar outbreak was reported from the Nyala district on September 12th. Immediate investigation was instituted and it soon became clear that the whole of the northern Zalingei area was heavily infected and that in addition serious outbreaks, with a very heavy case mortality estimated at 60 to 80 %, were present in the Kebkebia and Nyala districts.

In view of the fact that louse-borne relapsing fever had been epidemic in West Africa since 1921 and more recently had spread to the Tchad region and to Wadai it was decided to treat this disease as being louse-borne pending further investigation.

A pathologist from the Wellcome Tropical Research Laboratories was sent to Darfur to investigate the nature of the infection, and a medical inspector and three Syrian medical officers were detailed for epidemic duty under the direction of the Senior Medical Officer of the Province. Later, a British sanitary inspector and an assistant medical officer were added to the staff.

The louse-borne character of the disease was confirmed by the pathologist on December 7th, 1926.



### **Measures taken to combat the Epidemic.**

(a) In the infected areas :—

- (i) All persons sick of this disease were isolated in temporary sheds and were treated with Novarsenobenzol.
- (ii) All infected villages were systematically deloused and this was continued for a period of 3-6 weeks after the occurrence of the last case. All villages in the neighbourhood of infected villages were similarly deloused.
- (iii) Infected villages were temporarily evacuated during delousing.
- (iv) Where villages were especially dirty they were moved to a new site and in such cases an effort was made to group the villages in situations which could be made accessible by roads.
- (v) Movement from infected to non-infected areas was as far as possible prevented.

(b) Prevention of spread to other provinces :—

- (i) Delousing stations were established at nodal points on all roads leading from Darfur into Kordofan. All persons were examined at these stations and in the great majority of cases deloused. Sick persons were detained under observation.
- (ii) Careful watch was kept along the Bahr el Ghazal Province borders where they march with Darfur and the French Congo.

### **Progress of the Disease.**

Towards the end of December, the position was as follows :—

- (i) The mortality in Zalingei district had been very heavy. The deaths in this area were estimated at 10,000 out of a total population of 45,000.
- (ii) It had been shewn that the disease could be stamped out in limited areas if adequate staff was available, and that cases treated with Novarsenobenzol usually recovered.
- (iii) Further extension eastwards had occurred in El Fasher merkaz and in the Nyala district. The outbreak in Nyala district had reached a point within 110 miles of the Kordofan border.

Steps were taken at the end of the year to despatch further medical staff to the epidemic area.

### **The possibility of preventing the further spread of the Epidemic.**

Up to the present this epidemic has travelled across Africa unchecked excepting that it has not spread to the naked populations who are unlikely for this reason to be affected by a lice borne disease.

The question arises, will it be possible to check this disease on the eastern borders of Darfur or will it inevitably spread through Kordofan to the thickly populated area of the Gezirah.

Up to the commencement of the rains in June the country becomes increasingly dry and the traffic more rigidly confined to the established roads on which water can be obtained. As soon, however, as the rains commence and the young grass appears it becomes possible for the Arabs and other travellers to move in any direction and all hope of effectual quarantine operations will be at an end.

It remains to be seen if it will be possible before this time to limit the epidemic in Darfur to an area sufficiently confined as to admit of effectual quarantine measures being taken around it and thus to prevent the transmission of the disease eastwards into the central Sudan.

There are certain factors that render this very difficult :—

- (i) The difficulty and the length of time involved in the transport of staff and still more of supplies from railhead at El Obeid to El Fasher in Darfur ; this difficulty being due to the deep sand on the road.
- (ii) The extreme ignorance and squalor of the Fur population, and owing to the recentness of the administration their timidity of all administrative interference which is apt to result in their disappearance into the mountains.
- (iii) The inaccessibility of the villages hidden in the mountains in many cases far from any roads of access.
- (iv) The lack of roads in the province as a whole.
- (v) The fact that owing to a failure of rains in other parts of Darfur corn and grazing can only be obtained in the infected area and that thus quarantine precautions are rendered very difficult.

Against these difficulties may be put the realisation by the administrative authorities on the spot of the urgency of the issue ; their co-operation and assistance in all quarantine measures and their urgent efforts to improve roads and communications.

## (2) TYPHOID.

The typhoid rate was somewhat increased throughout the Sudan generally. Epidemic outbreaks occurred at Malakal and Omdurman :—

(a) **Malakal.** An epidemic of typhoid fever broke out at Malakal in April amongst the troops of No. 1 Company Equatorial Battalion.

Thirty cases came under treatment, two of whom were civilians. Blood agglutination tests were positive in five cases only. Over 5,000 anti-typhoid inoculations were carried out.

The source of the outbreak was not discovered.

(b) **Omdurman.** Sporadic cases of typhoid fever occurred in the three towns from May to October 1926. In October a mild epidemic began in Omdurman. There were 30 cases which showed a positive agglutination in a 1 in 40 or higher dilution. A number of cases also occurred which were diagnosed clinically as typhoid, but in which no laboratory confirmation was obtainable.

The case mortality rate in positive agglutination cases was 9 %.

The source of the infection was not definitely discovered. 1122 prophylactic inoculations were carried out.

## (3) INFLUENZA.

An epidemic of this disease occurred in Berber Province in January, February and March, 1926. Of the British population at Atbara 51 persons came under treatment. A large number of natives were affected, but the death rate was not heavy.

## (4) MEASLES.

A widespread epidemic of this disease occurred in Dongola in the spring of 1926 causing some mortality among the infants.



**(5) WHOOPING COUGH.**

This appeared in epidemic form at Melut and Kodok in the Upper Nile Province, 95 and 45 cases occurring at these two places.

Small outbreaks of measles, diphtheria, whooping cough and mumps occurred in various parts of the Sudan, but did not reach epidemic dimensions except as mentioned above.

**(6) RABIES IN KORDOFAN.**

In October 1925, rabies was reported as epidemic among dogs in Kordofan Province. One policeman who had been bitten by a rabid dog one month previously was admitted to El-Obeid civil hospital and died of rabies the next day.

Sixty nine other cases were reported as having been bitten by suspected dogs. Of these, seven were sent to Cairo for treatment. The remainder were treated at Khartoum civil hospital, each patient receiving fourteen injections of an anti-rabic vaccine. There has been no record of any case having subsequently developed rabies.

Every effort was made to destroy all ownerless or neglected dogs, and movement of dogs by train or ferry was prohibited. The epidemic died down in the course of the summer.

**ENDEMIC DISEASES.**

(1) **Malaria** is the most serious of the endemic diseases of the Sudan both in its effects on officials of the Government, in causing loss of efficiency and invaliding, and in its effects on the native in increasing the death rate and in diminishing the birth rate and in causing loss of agricultural and industrial efficiency. It is also the commonest cause of still-birth and of infant mortality.

In the northern Sudan malaria is endemic only on certain irrigation farms. It should be possible with adequate medical and sanitary staff to eliminate all the important endemic centres in this area and to forestall or deal with epidemic outbreaks.

In the central Sudan malaria is only endemic in certain restricted marshy areas where water persists for the greater part of the year. It may also be said to have been endemic in the irrigated area for the year under report.

Malaria becomes epidemic throughout the central Sudan during and after the rains and the intensity of these epidemics vary with the rainfall. Thus when the crops are exceptionally good the malarial incidence may be so heavy as to interfere seriously with the crops being harvested.

As regards the irrigated area it should be possible to deal with this area on the lines laid down on page 28 and thus to render it malaria free for nine months in the year.

During the three rainy months the central Sudan as a whole is, and will continue to be, malarious.

We can expect to keep the towns free of malaria and at a considerably later date, it may be possible to keep the irrigated area malaria free during these three months also.

For the rest we can only combat the disease during this period by:—

- (i) Multiplying dispensaries.

- (ii) Encouraging the widespread use of the mosquito net.
- (iii) Eliminating as far as possible debilitating factors such as bilharziasis which in particular is found to decrease greatly the resisting power to malaria.
- (iv) By improving the general nutrition of the population by increasing their purchasing power, by agricultural development, etc. This improved nutrition and increased resisting power to malaria is noticeable in the irrigated area.

In the southern Sudan malaria is endemic throughout the area, but its incidence is greatly intensified during and after the rains. It is possible to keep the provincial headquarters towns where favourably situated malaria free throughout the year, but for the rest the mosquito net, the mosquito tent and the screened house have to be relied on.

## (2) SYPHILIS.

This disease is widespread throughout the northern and central Sudan and many parts of the southern Sudan are also heavily infected. It is a common cause of abortion and still birth, and as such is probably second only to malaria in its effect in lowering the birth rate.

Anti-syphilitic treatment is given very widely at all hospitals and dispensaries and with the increase in the number of dispensaries a steadily increasing number of syphilitic cases come under treatment every year; about half the work of the outlying dispensaries is anti-syphilitic work. It is extremely difficult to collect figures of any value as to the incidence of this disease. There is, however, some reason to believe that in purely native areas where the population has for some years been within reach of hospitals or dispensaries there is a definite decrease of primary and secondary cases.

In other areas such as the Medani area of the Gezirah where an apparent decrease had taken place the influx of labourers, merchants, etc. from all parts of the Sudan and from other countries has apparently reversed the process.

In certain areas of the south syphilis has been introduced by Arab traders and has spread rapidly.

The solution of the problem is to bring medical assistance within reasonable reach of all centres of population. The infected native comes forward for treatment with the greatest readiness and will willingly undergo treatment by injection of Novarsenobenzol until all symptoms have disappeared.

In the majority of cases the patient goes away before he is completely cured, but he goes away free of all infectious lesions and this is the important point as regards Public Health.

I do not consider that the outlook as regards this disease is unfavourable so long as it is possible by steadily increasing the number of our dispensaries to bring anti-syphilitic treatment within reach of all centres of population. There are still large areas of the Sudan where the people are out of reach of any medical treatment.

## (3) BILHARZIASIS.

Twenty one new bilharzia centres have been opened during the year under consideration. 13,752 cases have completed treatment for bilharzia.



These cases were distributed as follows:—

Kordofan both hospital and bilharzia centres ...	...	4,657
Dongola „ „ „ „ „ „ ...	...	5,245
Kosti Quarantine .. .. .	...	61
Wadi-Halfa „ .. .. .	...	1,429
Various hospitals and dispensaries .. .. .	...	2,360
		<hr/> 13,752 <hr/>

**History.** Previously to 1918 it was known that sporadic cases of this disease occurred in Berber, Dongola and Halfa Provinces and in the larger towns where considerable contact with Egyptians had occurred.

In 1918 attention was focussed on this disease by the elucidation of the life cycle of the infecting worm by Leiper and by Christopherson's work at Khartoum civil hospital on antimony tartrate as a remedy for the disease.

In 1921 an epidemic of bilharzia was reported to have broken out on the pump irrigation farms at Nuri and Gureir in Dongola Province, and about the same time heavily infected bilharzial foci were found in Kordofan Province at Um-Ruaba and Abu-Zabad. In Berber Province the schools at Mograth Island and Shereik also were found to be infected to the extent of 60%.

The treatment of all infected recruits in the Egyptian labour battalion was commenced at Atbara in 1921.

An assistant medical officer was posted to Nuri in 1921, and 1,629 infections were reported there. Tours of two or three months' duration by British medical inspectors were arranged in this Province during the winters of 1921, 1922, 1924 and 1925, but up to the end of 1925, it had been impossible to arrange for continued treatment throughout the year, and owing to lack of supervisory and subordinate staff it had up to that time been impossible to carry out any co-ordinated attempt to attack the disease both in its human and snail cycle.

In the meanwhile, however, a great deal of very useful information had been obtained as to the extent and distribution of this disease in the Sudan, and encouraging results had been obtained in localised areas as a result of treatment.

Owing to the completion of the Sennar Dam in July 1925 and the commencement of irrigation on a large scale in the Gezirah the necessity of keeping these canals free from bilharzia infection became of paramount importance.

In December 1925 it was decided to prohibit the entry of bilharzia infected Egyptian labour into snail infested areas, and arrangements were made either to reject or to treat and cure at Wadi-Halfa Quarantine station all infected labourers proceeding to such areas.

In the early months of 1926 a scheme was put forward for establishing systematic work in the affected areas of Dongola, Berber, Kordofan, Nuba Mountains and White Nile Province. This scheme envisaged the engagement of three additional medical inspectors for this work, the training of considerable subordinate staff, and included work under three headings:—

- (i) Treatment of infected persons.
- (ii) Anti-snail work.
- (iii) Propaganda.

As soon as financial approval was received subordinate staff were engaged.

Large quantities of copper sulphate for anti-snail work were put on order, and bilharzia pamphlets for wide-spread distribution were printed.

In addition, the Mohammedan religious authority was asked to write a Fetwa (religious decree) forbidding contamination of water with human excrement, and this was printed and widely distributed.

The religious and educational authorities were approached with regard to using their influence to prevent the contamination of water by urination or defaecation.

A course of very simple health instruction in which bilharzia prophylaxis took a prominent place was drawn up for use in Kuttabs (village schools) and Khalwas (native schools).

### RESULTS OF TREATMENT.

(1) **Dongola Province.** In 1926 for the first time it has been possible to keep a medical inspector in Dongola Province throughout the year. 3,300 cases of bilharzia were treated during this time.

In October an examination of 307 previously treated cases selected at random showed a reinfection rate of 4 per cent.

Endeavours are being made to combine treatment work with more effective anti-mollusc work and it is hoped by this means to decrease the percentage of reinfections.

A great obstacle to effective work has been the difficulty of supervision over an infected area extended on both sides of a long stretch of river. It is hoped that a small steamer that has been put on order will soon be available and will ensure more effective supervision.

(2) **Kordofan Province.** The first organised anti-bilharzial work was begun in December 1924, but continued supervision only became possible last autumn, 1926.

The school figures for the two years are :—

Um Ruaba	...	...	...	1924-25	31.7 <sup>10</sup> / <sub>100</sub>
	...	...	...	1925-26	7.0 <sup>10</sup> / <sub>100</sub>
Rahad	...	...	...	1924-25	49.4 <sup>10</sup> / <sub>100</sub>
	...	...	...	1925-26	20.7 <sup>10</sup> / <sub>100</sub>
Abu Zabad	...	...	...	1924-25	74 <sup>10</sup> / <sub>100</sub>
	...	...	...	1925-26	12.1 <sup>10</sup> / <sub>100</sub>

If the boys attending a school may be looked on as a sample of the district these figures would appear to be encouraging.

The work in Kordofan presents certain special features involving special difficulties and some very puzzling problems.

The infection is conveyed by snails infesting larger or smaller lakes or pools formed during the rains, and drying up after periods lasting from four to seven months, according to their size and depth of water. They may be as much as two miles by half a mile in area and 3-4 feet in depth. As soon as the country begins to dry up the Arabs drive their herds from all the surrounding districts to water at one or other of these lakes. As the season progresses, the water becomes very foul. The natives (except in so far as it is possible to prevent them) drive their cattle into the water to drink, wading into the water with them, and they urinate and in some cases defaecate in or near the water. It is thus apparent that as soon as bilharzial snails are present in the water in a sufficiently mature state to transmit the disease there are ample opportunities for the completion of the cycle.



The special difficulties referred to are:—

- (i) The difficulty in persuading these people, who are nomad or semi-nomad to submit to a treatment which involves remaining in or near the treatment centre for 30 days.
- (ii) The difficulty in dealing with the snails owing:—
  - (a) To the extent of the water to be dealt with and the thickness of rushes and water weeds growing in it.
  - (b) To the fear and mistrust engendered among the Arabs by adding any chemical substance to the water or even by clearing away weeds, and the great difficulty experienced in persuading, or even compelling, them to water at such a cleared area.

As a result of the fact that these lakes are only spreading infection for a period in all probability not exceeding four months the natives are not heavily infected, and the disease does not take on the gravely debilitating form that it is apt to assume in districts where infection is perennial, e.g., canal infection.

The chief importance of the disease in Kordofan is that the infected Arabs reinfect the lakes every year and these lakes not only reinfect local Arabs, but also infect the large numbers of pilgrims and labourers travelling, from Darfur and the west, to the Gezira irrigated area.

The role played by these lakes in infecting persons travelling eastwards to the Gezira is probably a very important one and a serious effort will have to be made to clear them of weeds and debris and as far as is possible to kill the bilharzia snails with some molluscicide.

The problems referred to in the opening paragraph are:—

- (i) How do these lakes become infested with bilharzial snails? They are all completely dry by the end of March and remain so until the rainy season sets in in July.  
Experiments show that bilharzial snails cannot survive drying for more than 24 hours. Moreover, earth has been dug out to a depth of two feet from the bed of the dried lakes and carefully washed out over a sieve, but no bilharzial snails have been discovered.
- (ii) Experiments by the Director, Wellcome Tropical Research Laboratories have shewn that a snail of under four months rarely survives infection long enough to transmit the disease. The incubation period in the snail is 30-40 days. Supposing, therefore, that these lakes become infected with snail spawn soon after they are formed, either by the agency of birds or in some other way, the snails will not be sufficiently developed to transmit the infection until four months later.

Moreover the bilharzia cycle in the snail entails a period of 30-40 days for its completion.

This would lead one to suppose that the lakes are not infectious until, at the least, four and probably five months after their formation, but such a supposition is controverted by the frequency of infection.

The following points, therefore, call for investigation as soon as staff is available:—

- (i) How soon after the formation of these lakes snails or snail spawn are present.
- (ii) How soon after the formation of these lakes infected snails are present.
- (iii) How soon infected snails, sufficiently mature to transmit the disease, are present.

The Director, Wellcome Tropical Research Laboratories has these and other kindred questions under consideration.

(3) **White Nile Province.** A medical inspector was posted to this Province in February 1926. No subordinate staff was available.

He was instructed to carry out a survey of the riverain population from Geteina to Gebelein. This survey took until the end of August.

He found that the whole riverain population from Gebelein to the north of Aba Island was heavily infected with both rectal and urinary bilharzia. In the case of one village 90% of the population was infected, and in many villages 60-80% were infected.

From Geteina to the north of Aba Island only rectal bilharzia was found; the infection at Kawa and Um Gerr was found to be 100% of those examined. The debilitating effect of the disease on the population in this area was very marked.

(4) **Berber Province.** The endemic area extends from Bouga to Abu-Hamed and from Abu Hamed to the Dongola border. The population in the latter area is very sparse and it is not proposed to undertake work in this area at present.

In addition to these definitely infected areas scattered cases occurred as far south as Atbara.

The endemic area from Bouga to Abu-Hamed is very heavily infected. It is hoped to be able to make a start in this area with organised combined anti-mollusc and treatment work early in 1927.

In September 1926, an outbreak of bilharzia was reported on Kitiab farm—to the south of Zeidab farm, i.e. in the uninfected area south of Atbara—119 persons being infected. This was alarming as it suggested that the infection might spread to Zeidab and the other southern farms which are at present uninfected; steps were taken to deal with the outbreak. The farm was declared to be free of the disease by December, and subsequent examination has shewn it to have remained free.

(5) **Bilharzia Survey in the Blue Nile Province.** During November and December a survey of the male adults and of many of the children in the irrigated area was made.

It is estimated that only about 80% of the adult male population was examined although efforts were made to examine all males.

A total of 23,297 males and 3,988 children were examined. Of these 921 cases were found infected. Those infected were treated.

The following table shows the numbers examined in various classes of population, and the number and percentage found infected in each class:—

	Local natives		Non-local natives	Borgowia	Fellata	
	Men	Boys			Men	Boys
No. examined ... ..	12,734	3,685	7,226	1,655	1,682	303
No. infected ... ..	39	37	314	241	233	57
Percentage ... ..	0.3%	1%	4.3%	14.6%	13.8%	18.8%



- “ Local natives ” are natives born and bred in the irrigated area.  
 “ Non-local natives ” are natives of the Sudan not born in the irrigated area.  
 “ Borgowia ” are natives of Borgu.  
 “ Fellata ” includes all pilgrims from West Africa.

The origin of infected natives from outside the irrigated area is as follows:—

Bahr-El-Ghazal Province	...	...	...	1
Berber Province	...	...	...	21
Dongola Province	...	...	...	51
Darfur Province	...	...	...	58
Egypt	...	...	...	6
The Fung Province	...	...	...	2
Halfa Province	...	...	...	5
Kassala Province	...	...	...	1
Kordofan Province	...	...	...	31
Khartoum and Omdurman	...	...	...	11
Nuba Mountains Province	...	...	...	28
White Nile Province	...	...	...	53
				<hr/> 268

Blue Nile Province:—

Hassa Heissa	...	...	...	10
Wad-Magbul	...	...	...	1
Rufaa	...	...	...	4
Kamlin	...	...	...	10
Hag Abdullah	...	...	...	1
Sennar	...	...	...	12
Managil	...	...	...	2
Wad-Medani	...	...	...	6
				<hr/> 46
Total				<hr/> 314

#### (6) Bilharzia Quarantine at Kosti.

In November 1926 compulsory examination and, if necessary, treatment of all 4th. class passengers travelling east, and of all persons crossing the Kosti bridge eastwards, was instituted in order to protect the irrigated area from infection:

In December 2,349 cases were examined. 61 of these were found to be infected and were treated.

#### (7) Quarantine, Wadi-Halfa.

During the year 6,379 Egyptian labourers were examined for bilharzia.

Of these 254 were rejected,

6,125 „ allowed to proceed to their place of destination,  
 1,076 being first treated at Wadi Halfa.

### SUMMARY OF BILHARZIA WORK UP-TO-DATE.

It will be seen from the above that although useful survey work has been accomplished, yet owing to lack of adequate British staff to ensure continued supervision and of subordinate personnel to staff the necessary treatment centres, it has been impossible up to date (except partially in Dongola and Kordofan during the last year) to carry out continued organised bilharzia work.

This by combining adequate antimollusc and treatment work with regulations and propaganda is directed to preventing the infection of man from snail and snail from man.

It is hoped during the coming year to provide the staff necessary to ensure this in the more important endemic areas.

#### (4) **Y A W S.**

This disease is endemic in the southern part of the Upper Nile Province and in the low-lying riverain part of the Bahr-el-Ghazal Province and of Mongalla Province. It is probably responsible in these districts for more inefficiency, crippling, deformity and suffering than all other diseases together.

Native information is to the effect that this disease has existed for generations, but that it has increased during recent years.

The damp swampy regions of the Upper Nile basin would appear to offer ideal conditions for the incidence and spread of this disease, and overcrowding, lack of sanitation, communal feeding, the handing round of the family pipe, together with the plague of flies around the cattle camps, afford added opportunities for its transmission.

Yaws may be contracted at any age, but the heaviest incidence appears to be in infancy and among young adults. Both sexes are affected in about equal numbers. The greater number of adults who attend for deformities or bone pains state that they had the disease in earlier childhood.

#### **Treatment.**

The treatment of yaws has been carried out by the Medical Inspector of the Upper Nile Province on the hospital ship or during inland tours since 1922. Up to 1925 large numbers of cases had been treated, but it had been impossible to carry out continued systematic treatment in any individual area. The work carried out was preparatory propaganda work to get the confidence of the native and to demonstrate the beneficial effects of European medicine.

In 1925 a commencement was made in continuous local treatment by establishing dispensaries at the more important centres on the river. At the present time there are eight dispensaries in this area, and six of these are dealing with yaws. 10,000 injections of Novarsenobenzol have been given for yaws during the year under consideration.

The Medical Inspector in charge of the Province still considers that the work is too dissipated to be really effective, and he proposes at the beginning of the year to commence intensive anti-yaws work in a definite circumscribed area. He has planned this work carefully with the District Commissioner in charge; a census of the population has been taken, nominal lists prepared, and every man, woman and child in the area will be examined and if found diseased will each be given a course of three injections. It will be interesting to note the result obtained in the selected area.

The disablement caused to thousands of natives during the eruptive stage of this disease, and the permanent deformities remaining in many cases as after-effects, are so important and would have such an adverse effect on any organised agricultural development as to demand that a scheme of systematic treatment of the whole population such as that planned by the Medical Inspector should be put in execution over as wide an area as possible.

#### (5) **KALA-AZAR.**

Kala-Azar is endemic in the Blue Nile valley south of Hag Abdallah (i.e. Sennar Merkaz and the Fung Province) and in the Dinder and Rahad valleys.

Twenty four cases of this disease were reported in the course of the year.



Of these:— 14 came from the Blue Nile Valley,  
 1 came from the Dinder valley.  
 2 came from near Wad Medani.  
 4 came from near Gedaref (Rahad basin).  
 3 came from Kassala

Of the Blue Nile cases two were Abyssinians, who may have been infected before arrival.

One of the Wad Medani cases was an Abyssinian, but both are believed to have been infected in the Fung Province.

Of the three Kassala cases, one was infected in Gedaref.

### Diagnosis.

The formolgel test has been used in the Fung Province for preliminary diagnosis.

A positive formolgel test (i.e. a whitish appearance and rapid solidification in  $\frac{1}{2}$ -30 minutes) was found only to occur in cases of kala-azar verified by the microscope.

During various tours made in the Fung Province a large number of formolgel tests were carried out. All suspicious cases were examined, and partially positive results were obtained in three cases. It would appear, therefore, that the Fung Province is not heavily infected with this disease.

Owing to lack of staff practically nothing is known as to the distribution of this disease in the Gedaref region and the Rahad valley.

### Treatment.

Stibosan and urea stibamine were both used for the treatment of this disease. They both gave good results, but the latter drug appeared to take a fortnight longer to effect a cure.

### (6) TUBERCULOSIS.

The following are the figures for admissions to hospitals for tuberculosis over the last ten years. The table also shows the percentage of admissions for tuberculosis to the total admissions for each year of this period:—

1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
194	216	191	219	220	234	251	290	292	371
1.5%	1.5%	1.4%	1.3%	1.35%	1.38%	1.46%	1.46%	1.46%	1.71%

It will be seen that there is no evidence of a progressive relative increase. There is, however, a definite relative increase during the year under consideration.

The following list gives the number of admissions by provinces and the increase in each case:—

Province.	Admitted	Total increase or decrease.
Khartoum ... ..	114	47 increase
Kordofan ... ..	20	11 „
White Nile ... ..	3	1 „
Berber ... ..	53	1 „
Kassala ... ..	27	6 decrease
Red Sea ... ..	50	3 increase
Dongola ... ..	28	9 decrease
Halfa ... ..	8	6 „
Blue Nile ... ..	34	15 increase
Fung ... ..	12	10 „
Nuba Mountains ... ..	3	3 „
Upper Nile ... ..	19	9 „



From this it appears that the total relative increase is due to an increased incidence in Khartoum Province. It is possible that this increase is due to the effect of the high price of the staple food during the year under consideration on a town-dwelling population freely exposed to tuberculous infection. No considerable increase of pulmonary tuberculosis is likely to occur in the northern and central Sudan where the population has been freely exposed to infection for many years, unless the vitality of the population is seriously depressed either by deficient nourishment or heavy malarialisation.

As regards the former; in spite of occasional setbacks, the general level of nutrition is steadily improving, and there is reason to believe that this tendency will be maintained.

As regards malarialisation; this factor depends largely on whether it is possible to keep the extensive irrigated areas malaria free. The matter will need very careful attention.

In the southern area, however, where the population has not been generally exposed to tuberculous infection a considerable increase of the tuberculous rate might reasonably be anticipated as these uncivilised tribes become increasingly exposed to contact with the outside world.

The Medical Inspector, Upper Nile Province reports that pulmonary tuberculosis is very prevalent among the Shilluks. This is the negroid tribe that has come most in contact with the outside world, also it is the most sedentary of these tribes. Beyond this observation there is at present nothing to indicate increased spread of this disease among the people of the southern Sudan.

## (7) DYSENTERY.

The following are the figures for admissions to hospitals for dysentery over the last six years. The table also shows the percentage of admissions for dysentery to the total admission for each year of this period:—

	1921	1922	1923	1924	1925	1926
Amoebic ...	477	390	504	605	483	543
Bacillary ...	89	48	27	111	326	271
Total ...	566	438	531	716	809	814
Percentage of all dysentery admis- sions to total ad- missions }	3.0	2.4	2.9	3.6	4.3	3.7

Bacillary dysentery in the Sudan is for the most part of the "Flexner" type, but a few cases of the "Hiss and Russell" and the "Shiga" types occur.

The Flexner type of bacillary dysentery is not usually a serious disease in the Sudan, and tends to natural recovery in a few days.

It is interesting to note that in the Red Sea Province dysentery is confined to the coastal towns, and is almost entirely bacillary. The incidence follows closely the seasonal variation in humidity, i.e. it is greatest at the time when flies are most common. During the times of great humidity on the Red Sea coast the fly question is a very difficult one.

The following table shows the distribution in the various provinces of reported cases of bacillary and amoebic dysentery:—

Province							Amoebic	Bacillary
Khartoum	...	...	...	...	...	...	150	29
Berber...	...	...	...	...	...	...	46	1
Red Sea	...	...	...	...	...	...	45	134
Dongola	...	...	...	...	...	...	20	—
Halfa ...	...	...	...	...	...	...	18	2
White Nile	...	...	...	...	...	...	32	7
Blue Nile	...	...	...	...	...	...	94	93
Kordofan	...	...	...	...	...	...	39	—
Kassala	...	...	...	...	...	...	23	5
Upper Nile	...	...	...	...	...	...	70	—
Nuba Mountains	...	...	...	...	...	...	6	—
The Fung	...	...	...	...	...	...	—	—

#### (8) LEPROSY.

**Northern and Central Area.** The incidence of leprosy in the northern and central Sudan is small.

In a population of 1,830,000 there are only 285 known cases i.e. less than 1 in 6,000.

There are probably a considerable number of unreported cases in southern Kordofan in which area medical work has only just been started and where the climate begins to change from desert to tropical conditions.

There is no evidence to suggest that leprosy is on the increase in this northern area and the position is in no way alarming,

There is a central leper hospital at Omdurman where 42 lepers are under treatment. Some of these are from Khartoum Province and the rest from various northern and central provinces.

A new leper hostel is in course of construction to replace the present buildings. Accommodation for 50 lepers will be provided.

There is also a small leper hospital near Gedaref where 15 patients from the surrounding districts are under treatment; moreover in Kordofan Province 20 patients out of a total of 109 notified are under treatment.

With these exceptions and with the exception of a few cases that are treated at the local hospitals, the lepers remain in their villages where they are completely or partially isolated according to local feeling on the subject.

**Southern Area.** In the middle south, i.e. the Nuba Mountains, the Upper Nile Province and the northern Bahr el Ghazal the incidence of leprosy is much higher and the matter becomes one of some importance.

A rough estimate gives the number of lepers in the Nuba Mountains Province as between 300 and 400 in a total population of 318,000. This is probably an underestimate.

No reliable estimate can be given for the Upper Nile Province and the northern Bahr-el-Ghazal. In this area (the middle south) the people are still wild and medical work is only just beginning to be brought within their reach.



It will only be possible to carry out effectual anti-leprosy work throughout this area when the confidence of the people has been won by general medical work.

In the meanwhile, although it will be possible to start leper hospitals at important places such as Malakal, Shambe, Wau, Rumbek and Aweil, for the most part it will be necessary to rely on propaganda among the Sheikhs and Chiefs pointing out the danger of infection and the need for isolation of infected cases in or near their villages.

**Extreme Southern area.** in the extreme south, i.e. the southern Bahr-el-Ghazal and Mongalla Province the percentage of lepers to the total population is very much higher and leprosy here becomes a factor to be reckoned with. There are reported to be 900-1000 cases in Mongalla Province and a similar number in the southern Bahr el Ghazal Province.

In the sleeping sickness areas which, however, bear a small proportion to the total area, intensive sleeping sickness work has been carried out over a considerable period; the confidence of the people in medical work has been gained and it will be possible to start treatment centres forthwith.

Up till now no certain cure for leprosy has been discovered in the sense that there are cures for syphilis, malaria, bilharziasis and yaws. For the present it is only possible to place the patient under circumstances that encourage natural recovery and to administer drugs which in some cases appear to favour this result. When a cure for leprosy has been discovered in any way comparable in its result to the effect of Novarsenobenzol on yaws and syphilis there will be no difficulty in persuading those infected with this disease to come forward freely for treatment.

It is important to avoid any form of compulsory isolation in leper hospitals or leper camps except in certain cases where an infected person by reason of his trade is a danger to the public, or in a case where the feeling of the tribe or community in which the leper lives is definitely in favour of such compulsion.

It is essential to avoid any course of action which might lead to concealment of the disease and it is important by propaganda and otherwise to do all that is possible to encourage early cases of this disease being brought forward for treatment.

Proposals have been put forward for instituting leper hospitals at Malakal in the Upper Nile Province, Wau, Rumbek and Aweil in the Bahr el Ghazal Province and at Yei, Kajo-Kaji and Opari in the Mongalla Province.

#### (9) **LEPER HOSTEL, OMDURMAN.**

This is a Government institution, but the care and treatment of the patients is carried out by the doctors of the Church Missionary Society Hospital. The Government is much indebted to these doctors for their willing and devoted work. The following is a short summary of the Church Missionary Society doctors' report.

This hostel contained 34 patients, 22 men and 12 women at the beginning of the year.

During the year eight new cases were admitted. Thus at the end of the year there were 42 patients.

The place of origin of the inmates is as follows:—

4	from Berber Province	
6	„ Blue Nile „	
1	„ White Nile „	
14	„ Khartoum „	
6	„ Darfur „	
4	„ Kordofan „	
2	„ Nuba Mountains Province	
1	„ Bahr el Ghazal	„
4	„ Dongola	„
<hr/>		
42	Total.	

Each patient has had weekly intramuscular injections of ethyl esters of chaulmoogra, with creosote and olive oil. Doses varied from .5 c.c. to 2 c.c. above which dose patients complained of fever.

The clinical charts showed but little improvement, whilst most cases had lost weight and advanced in the disease. In October and November chaulmoogra injections were stopped and saline substituted, and it was found that patients who had been steadily losing weight remained stationary.

In September six cases showing typical stages of the disease were photographed and bacteriologically examined before receiving a course of Sanocrysin. They walked to the hospital at 10 a.m. and walked back at 4 p.m. Six injections were given at weekly intervals, doses from .5 to 2 grs. No reaction occurred in the lesions and there was no alteration in the general condition of the patients.

**New Hostel.** A new hostel is in course of construction to replace the present temporary structures which are unsatisfactory.

The new building provides accommodation for 50 patients. It consists of an injection and treatment room, dispensary and office and a series of blocks each containing four single rooms designed to be used for one or two patients in accordance with the needs of the patients concerned.

An area is being taken up for a garden in which the patients will be allotted areas for cultivation, so as to afford them occupation in addition to angarceb (native bed) and mat making.

#### (10) GOITRE.

Goitre is endemic among the Arabs around Muglid, the Dinkas on the Bahr-el-Arab immediately to their south and among the Nuers of Khor Gaing to the south of the Bahr-el-Ghazal river.

In each of these districts the ground is black hardbaked clayey soil split up into deep fissures commonly called "cotton soil"

The Arabs drink from large ponds that form after the rains and become progressively foul as the season progresses. Before they dry up they are heavily contaminated with sewage.

The Dinkas to the south, however, drink from khors running in from the river and which supply a moderately clean water throughout the year.

In the case of the Nuers of Khor Gaing 51 cases were found in a relatively small population—Of these cases 50 were women. Here it is noteworthy that as the land rises, the soil changes and becomes partially sandy, the Dom and Deleib palm trees make their appearance and goitre ceases. The diet and customs of the people, however, are the same as in the neighbouring affected area. It is hoped to obtain further information about these three endemic foci in the near future, but distance and time make such investigation difficult.



**(11) ENDEMIC HYDROCELE.**

This affection appears to be very common in the Burun country, an area lying to the west of the Abyssinian border between the head-waters of the Blue Nile and the Baro. In part of this country as much as 20—25% of the adult male population is affected by hydrocele, some of them of great size. It has not yet been possible to investigate the cause of this affection, but as a few cases of elephantiasis of the scrotum are also reported from this region, the presumption is that the condition is to be attributed to a filarial infection. It is hoped that it will be possible to detail a Medical Inspector to investigate this affection in the near future and to afford the surgical treatment that is so much needed.

**(12) ANKYLOSTOMIASIS.**

This affection is endemic in Dongola Province and in limited areas in Kordofan and The Fung Provinces.

Limited local investigations suggest that the incidence of this disease in Dongola is definitely diminished as a result of the widespread treatment carried out in 1924.

Up to the present ankylostomiasis has not been found to be endemic anywhere in the irrigated area of the Gezirah, but careful watch will have to be maintained for the occurrence of ankylostomiasis in this area as the continual moistening of the soil by irrigation will afford conditions suitable to the ready transmission of this disease.

**(13) TRACHOMA.**

Trachoma is endemic in Halfa, Dongola and Berber Provinces and in the towns of the northern and central Sudan. The incidence is heaviest in Halfa and Dongola Provinces, i.e. the two provinces nearest to Egypt. In these two provinces the percentage of infected school children is in some places as high as 40%.

Systematic treatment of school children is carried on throughout the Sudan but in the more heavily infected provinces it is doubtful if much progress can be made until it is possible to treat the children under school age in their homes. Some progress has been made by extending treatment to the Khalwas, the purely native schools where small children are taught to read and write by native Sheikhs.

**(14) MALTA FEVER.**

12 cases of this disease were reported with one death as compared with 11 cases last year. Their places of origin were as follows:—

Khartoum	...	...	...	1	Case reported
El-Dueim	...	...	...	1	„
Kassala	...	...	...	5	Cases reported
Singa	...	...	...	5	„

## REPORT ON SLEEPING SICKNESS

FOR YEAR ENDING SEPT. 1926.

BY PRINCIPAL MEDICAL OFFICER, SUDAN DEFENCE FORCE.

### PERSONNEL.

Province.	Name.
Bahr El Ghazal	Major J. R. N. Warburton, M.C, R.A.M.C. Senior Medical Officer.
„	El Saghkolaghasi Nesib Eff. Baz.
„	El Yuzbashi Khelil Eff. Jabour, M.C.
„	El Mulazim Awal Fuad Eff. Athnase Saikali.
„	El Mulazim Awal Joseph Eff. Tannous Nasr.
„	El Mulazim Awal Boghos Eff. Shamlan.
Mongalla	El Bimbashi Yusef Eff Derwish, O.B.E., Senior Medical Officer.
„	El Saghkolaghasi Negib Eff. Yusef Yunes, M.B.E.
„	El Yuzbashi Faiz Eff. Suliman Nassar.
„	El Yuzbashi Abdulla Eff. Mansour.
„	El Mulazim Awal George Eff. Murad Rizk.
„	El Mulazim Awal Mohammed Eff. Emin Talhouk

The following changes in Personnel are recorded during the past year :—

Captain G. K. Maurice, D.S.O., M.C., R. A. M. C., re-transferred to the Army on 15-1-1926.

El Yuzbashi Ragheb Eff. Atia re-transferred to the Army on 9-12-1925.

El Yuzbashi Emile Eff. Naim re-transferred to the Army on 14-9-1926.

### REVIEW OF WORK DURING THE YEAR.

**Mongalla Province.** No fresh cases were detected in Yei District. This is the fourth year that the district has been clear of the disease.

Three cases were admitted to Kajo-Kaji. Two of these were almost certainly Uganda infections. It is possible that sporadic cases will be found in this area for another two years.

For the first time since 1915 no cases were found in Nimule sub-district.

A scheme of villagisation in Fly areas hitherto uninfected was carried out as a precautionary measure and some of the Acholi tribe were moved to the hills above 4,000 feet, the height at which Fly were found not to be able to exist. This is most satisfactory and the natives have now got their crops going and have settled down.

Boundary markets have been established on the International frontiers to discourage crossing the boundaries for products peculiar to the countries concerned, with good results.



The use of French grass to keep down vegetation at drinking places has been extended and found satisfactory.

A census in each district was compiled this year giving an increase over that of last year of 1% in Kajo-Kaji, 3.5% in Yei, 2% among the Acholi and a decrease of 1% among the Madi.

Kajo-Kaji District, in spite of the severe epidemic of dysentery which took place last summer, has still been on the increase.

Investigations as to the cause of decrease in the Madi area are being carried out and the results will be reported later.

From various sources one gathers that sleeping sickness is well established in Dungu District, and making headway in Faradji District in the Belgian Congo.

There is an unconfirmed rumour of a considerable number of deaths from sleeping sickness in Uganda not far from the Sudan boundary. All such outbreaks must be viewed with grave concern, and every effort made to obtain the co-ordination of the Uganda authorities in preventing a spread to the Sudan.

In view of the satisfactory state of affairs in the Mongalla sleeping sickness areas, it was found possible to relax some of the sleeping sickness restrictions locally and allow recruiting of soldiers and labourers in certain areas for employment in uninfected areas of the Sudan outside their administrative boundaries, beyond which they have not previously been allowed to pass.

251 cases remain under treatment.

**Bahr El Ghazal Province.** 79 cases were detected in the Tembura District, one in Yambio district and one in the Western District.

The population in the segregation settlement at Source Yubo is 4477, of whom only 1744 are patients, an indication of the popularity the settlement has achieved. The uninfected live there voluntarily. There seems little doubt that the "Settlement" system of Bahr El Ghazal where each householder is settled in and supports himself from his own cultivation and where communal cultivations are only maintained for the supply of seeds and the support of the helpless and newly admitted, is more attractive to the native than the "Camp" system of Mongalla, where patients live in circumscribed camps sustained by communal cultivations supplemented by private small holdings.

The former system entails the occupation of so much space that it is more difficult to render and maintain the site fly free. It is however, undoubtedly the best system where large numbers of patients are involved.

A few minor adjustments of villages where infection persisted have been carried out but it is believed that no further moves in the future will be needed.

Natives from French Equatorial Africa have persisted in trying to settle in the Tembura district. Two hundred and one were returned to the French authorities and many must have avoided detection.

It was therefore decided to allow immigrants to settle in the district subject to six months quarantine at Source Yubo. Between June 25th and October 1st., 1926, 185 immigrants reported their arrival and were allowed to remain. Of these 14 were found to have sleeping sickness and one developed the disease a month later.

Some 40 cases come weekly for treatment from French Equatorial Africa.

Boundary markets and regular meetings of officials at last have been established on the Belgian frontier. For years there has been a French boundary market at Source Yubo, but no meetings of administrative officials have been recently reported.



In the Provinces of Mongalla and Bahr El Ghazal, the following were carried out:—

Examinations by palpation.	Gland punctures.	Injections of Atoxyl.
658,715	2,459	19,835

Co-operation between the administrative and medical staffs in both provinces has continued highly satisfactory.

### REVIEW OF PRESENT SITUATION.

This can be best appreciated by a glance at the past.  
The following figures are enlightening:—

#### Admissions for the Year Ending 30th September.

	MONGALLA.			BAHR EL GHAZAL.
	Yei	Kajo-Kaji	Nimule	Source Yubo
1911	268	—	—	—
1912	140	—	—	—
1913	139	—	—	—
1914	24	—	—	—
1915	17	187	6	—
1916	21	197	14	—
1917	14	95	4	—
1918	32	42	2	255
1919	15	63	8	621
1920	32	54	2	192
1921	24	31	12	656
1922	7	68	35	434
1923	3	5	4	839
1924	—	82	9	276
1925	—	10	9	203
1926	—	3	—	79
Totals	736	837	105	3555

Total Mongalla	..	..	..	..	1678
Total Bahr El Ghazal	..	..	..	..	3555

These figures clearly demonstrate that the Sudan has been faced by two epidemics of sleeping sickness; that it has cleared up one of them completely, and is well on the way to clear up the other.

There is no other country in Africa that can point to similar results. In most the disease is steadily gaining ground.

The figures are of further interest as indicating first, the fruitlessness of an inadequate campaign, secondly, the comparatively quick reward of determined effort, and thirdly, the necessity of a radical alteration of the peoples' way of living, should this latter be incompatible with the arrest of sleeping sickness. A little explanation of the Bahr El Ghazal figures is necessary to make this clear.

The first 255 cases were found in Tembura station by a single Syrian medical officer in the seven months March to September, 1918. All but 12 of these were recently settled immigrants from French Equatorial Africa, large numbers of whom were entering the Sudan at the time. It was through them the disease was conveyed to Bahr El Ghazal.

The 1919 figures 621 were the result of an additional British medical officer touring the district.

The fall to 192 in 1920 was due to this British medical officer leaving sick, and his successor dying three days after arrival. Thus the District was left to one Syrian medical officer who could not leave the station for a whole year.

The next year's figures 656 resulted from the third British Medical Officer's efforts, but as he contracted black-water fever in August, 1921, inspections fell into abeyance for a few months. The 1922 figures fell to 434.

Overwork through shortage of staff made the maintenance of health a difficult matter. The shortage was due to the aftermath of war.

In addition to this there was a very inadequate administrative staff for the needs of the situation and the people were not only very backward but continued their custom of leading isolated lives in the forest. There was not a village in the district. It was early recognised that to put the people into villages on accessible roads was the only solution but the practicability of such a course was not so clear. Those on the spot felt they were tilting at windmills.

In 1923 the people were put into villages and sufficient medical staff was forthcoming and a whole-time District Commissioner posted to the district. The admissions for the year rose to 839 to be followed by the spectacular fall to 79 in three years. This fall was not fictitious as previous years, but a genuine diminution in the incidence of the disease, resulting from:—

- (1) Establishment of villages which
  - (a) Increased the census by 15,000 and prevented concealment of sick.
  - (b) Allowed cleared Fly free watering places.
- (2) Almost bi-monthly inspections of the whole district.

This enforced change in the habits of the people has left behind it no resentment. Rather it is the reverse.

For the first few years over large areas of the district the people bolted at sight of a white man and in 1919 the Senior Medical Officer at one place was threatened that his advance would be met by poisoned arrows, a threat, however, they failed to carry out. At the present day the greeting to a white man is almost hilarious. The Senior Medical Officer's report in 1924 contains the following passage:—

“Now that the people are settled in their villages they have every appearance of liking this mode of life. It is improbable that it is the normal life of the tribes of Southern Bahr El Ghazal to live isolated lives in the forest. It is more likely that this mode of life was forced upon them by the Arab slave raids that for generations past have taken place and continued up to comparatively recent times. Certainly the people seem better and brighter in their new conditions, and a traveller now, instead of making his way between two walls of grass, passes through a smiling land, among smiling crops and smiling people.”

If additional evidence is needed, witness the emigration from French Equatorial Africa already detailed, and the fact that 2733 people are living voluntarily in the settlement.



## PROSPECTS FOR THE FUTURE.

These are less rosy than they appear.

The Sudan is spending something in the region of £. 17,000 a year on sleeping sickness and put this sum up on the advice of its medical advisers that the disease could be brought under control. This has been done but there is no prospect of curtailment of expenditure until such time as infected countries bordering on the Sudan establish control on a similar scale.

In the absence of strenuous and effective action over the borders by the governments of Uganda, Belgian Congo and the French Congo, the maintenance in the Sudan of a large staff to detect foci of infection from outside is inevitable.

The infected parts of French and Belgian territory may be so large that control of the whole is not feasible. Uganda, however, is scarcely so large as the province of the Bahr El Ghazal

It is likely that any measures short of those adopted in the Sudan would be of little avail, but when these countries make adequate provision, if only along the Sudan frontier, this country can start on retrenchment.

Number of persons under treatment in Sleeping Sickness Camps on 30th September, 1926:—

Yei	...	...	...	...	...	49
Kajo-Kaji	...	...	...	...	...	172
Nimule	...	...	...	...	...	30
Ikotos	...	...	...	...	...	—
Raga	...	...	...	...	...	22
Tembura...	...	...	...	...	...	1744
Yambio	...	...	...	...	...	19
Total ...						2036

Khartoum,

22nd April, 1927.

Sd. W. HUNT, Major,

*Principal Medical Officer,  
Sudan Defence Force.*

## PROGRESS IN MEDICAL WORK.

A considerable advance was made during the year in bringing medical assistance within the reach of the native population both by an extension of the radius of action of the provincial hospitals and by opening new dispensaries in centres of population which are out of reach of the provincial hospitals. The former has been to some extent the result of the latter as the more severe cases are sent in to the hospitals from the outlying dispensaries.

The following list shows a comparison between the total inpatients and outpatients treated at all hospitals and dispensaries during the year under report and the two preceding years :—

	1924	1925	1926
Inpatients ... ..	19,827	18,637	21,738
Outpatients ... ..	394,418	470,697	833,990

As a result of this extension of work increased accommodation is needed at many of the hospitals.

Certain additions have been completed during the year ; further additional accommodation will, it is hoped, be undertaken during the ensuing year.

The following additions to hospitals have been completed :—

El Obeid ... ..	Bathroom and latrine.
Port Sudan ... ..	Garage.
Malakal ... ..	1st class ward and Assistant Medical Officer's quarters.
Singa ... ..	Operating theatre enlarged.
Kassala ... ..	Prison ward, 1st class ward, 3rd class ward, Attendants' quarters, Laboratory.

The following new dispensary buildings have been completed during the year ; some of these were to replace temporary buildings in use, but inadequate for the purpose :—

Khartoum Province ... ..	Geili.
Kordofan Province ... ..	Muglid, Um-Ruaba and Rahad.
Red Sea Province ... ..	Akik and Musmar.
Dongola Province ... ..	El-Seir.
Kassala Province ... ..	Aroma and Derudeb.
Berber Province ... ..	Shendi.

There are still large areas of the Sudan in which the population is out of reach of any medical assistance. It is hoped to increase steadily the number of dispensaries until medical assistance is within reach of all considerable centres of population.

New dispensaries have been opened at the following places during the year under report :—

Upper Nile Province... ..	Bor, Duk Fayeuil and Yoynyang.
Kordofan Province ... ..	Muglid.
Red Sea Province ... ..	Gebeit Mine.
Kassala Province ... ..	Aroma.
Berber Province ... ..	Shendi.
Nuba Mountains Province ... ..	Dilling.



## PROGRESS IN CERTAIN PROVINCES.

**Khartoum Civil Hospital.** A considerable increase in the work at this hospital took place during the year under consideration.

This is specially noticeable in the outpatient department.

The following figures show the general increase in work :—

	1925	1926
Outpatients ... ..	29,640	40,106
Inpatients ... ..	1,782	2,448
Operations ... ..	408	466
Attendance for massage and electricity	2,137	3,821

Additional accommodation is needed and in particular for European patients; to meet this need the construction of a separate European block is under consideration. Such a block would provide more suitable accommodation for patients and would render additional beds available for native patients.

The institution of an electricity and massage department has been a noticeable development of the hospital work and has met a serious need.

A new X ray apparatus has been installed; this will allow an extension of the work at present undertaken and will enable adequate investigation of pathological conditions of the heart, lungs and the alimentary tract to be carried out.

**Kordofan Province.** A greatly increased amount of work has been carried out this year, both at El Obeid civil hospital, and in particular by the travelling hospital and the various dispensaries.

The recorded total of outpatients seen in the Province during the last three years is:—

1924	1925	1926
28,399	55,927	117,342

It is interesting to recollect that there was very little medical work indeed done in this province outside the El Obeid civil hospital before December 1924 when a medical inspector was first posted to this province for bilharzia work.

**Nuba Mountains Province.** A dispensary was opened at Dilling in March 1926, and a dispensary hakim was put in charge. He obtained the confidence of the people, and large and increasing numbers of inpatients and outpatients are being treated at this dispensary, which is now being enlarged to accommodate 50 inpatients. The work is being carried on in considerable part among the inhabitants of certain hills who have hitherto been so shy of contact with the outside world as to be practically unapproachable.

There is an urgent need for increased medical work in this province. The bulk of the population is out of reach of any medical help and the need for such help is very great. It is very much to the interest of the Government both for economic and political, as well as for humanitarian and public health reasons, that this gap should be filled.

**Kassala Province.** The work at the civil hospital has shewn a marked increase during the last three years:—

	Inpatients.	Outpatients.	Operations.
1924	656	6,789	75
1925	1,099	13,512	115
1926	1,390	26,173	329

To meet this expansion of work a first class and a third class ward, a laboratory and an attendants' room have been added to the hospital.

**Upper Nile Province.** The work in the Upper Nile Province has increased very greatly. The following is a list showing the numbers of inpatients and outpatients treated during the last three years :—

	Inpatients.	Outpatients.	Operations
1924	465	21,984	241
1925	773	52,285	415
1926	1,279	55,876	378

The nominal accommodation at Malakal hospital is for 44 beds while the number of inpatients during last December was seldom less than 180 and showed every evidence of further increase. Every expedient was resorted to in order to accommodate these patients.

A new 24 bedded 3rd. class ward will shortly be commenced, but this will not go very far to meet the steadily increasing numbers.

### MEDICAL WORK CARRIED OUT BY CHARITABLE INSTITUTIONS.

There are three Missionary Societies carrying out medical work in the Sudan :—

(1) The Church Missionary Society has a hospital at Omdurman and another at Lui, in Mongalla Province,

(2) The Sudan United Mission has a small hospital at Melut, in the Upper Nile Province,

(3) The American Mission has a hospital at Nasser on the Sobat River.

#### (1) THE CHURCH MISSIONARY SOCIETY HOSPITAL AT OMDURMAN.

**Staff :—**

One Surgeon in charge (British),  
One Lady Doctor (British),  
Three nurses (British).

**Accommodation :—**

Male beds	...	...	...	...	21
Female beds	...	...	...	...	24

There is a good operating theatre and an ophthalmic clinic.

**Totals for the year :—**

Inpatients men	...	...	...	...	343
Inpatients women and children	...	...	...	...	406

**Outpatients new cases 5,429 constituted thus :—**

Men	...	...	...	...	2,016
Women	...	...	...	...	1,819
Children	...	...	...	...	1,594

**Total outpatients, attendances** .. .. 18,009



**(2) THE CHURCH MISSIONARY SOCIETY HOSPITAL AT LUI.**

Medical work was commenced in 1921. A small permanent hospital opened in 1926.

**Staff:**— One Surgeon (British).

4,638 cases were treated in the course of the year—Of these 1,592 were cases of Yaws.

There is a leper colony run in connection with the hospital where some 70 lepers are maintained and treated.

**(3) THE SUDAN UNITED MISSION HOSPITAL AT MELUT.**

**Staff:**— One Surgeon (British).

The hospital has a small operating theatre and accomodation for a few inpatients.

Total treatments	...	...	...	...	6,518
Admissions	...	...	...	...	378
Operations	...	...	...	...	64

A few lepers are maintained and treated in a group of huts reserved for that purpose.

**(4) THE AMERICAN MISSION HOSPITAL AT NASSER.**

**Staff:**— One Surgeon (American).

Two sisters (American).

There is an operating theatre and an outpatient clinic.

14,596 treatments were given during the year; 90 minor operations were performed.



## SANITATION.

### GENERAL ORGANISATION.

With the exception of Khartoum Province, where the sanitation is under a special Medical Officer of Health, the public health and sanitation of each province is under the control of the Senior British Medical Inspector posted to the province, who, in addition to his other duties, is the Medical Officer of Health of the Province. He is responsible for the public health of the province and in particular for the organisation of anti-malarial measures both in the towns and in the cultivated areas, for the sanitation and conservancy of the towns, for the supervision of irrigated areas and for dealing with any epidemic disease.

In the large provinces he has under him one or more British sanitary inspectors and under them in turn native sanitary overseers, conservancy staff, mosquito brigade and bilharzia snail men.

There is a total of 15 British sanitary inspectors employed in the Northern and Central Sudan.

These are posted as follows:—

Sudan Medical Service—Travelling	...	...	1
Khartoum Province	...	...	6
Berber Province	...	...	4
Blue Nile Province...	...	...	2
Red Sea Province	...	...	2
			15

The health of Khartoum Province is dealt with separately by the Medical Officer of Health.

#### (1) HEALTH OF THE IRRIGATED AREA.

Owing to scanty rains there was little malaria following the rainy season.

In January-February there was an outbreak of malaria among the immigrant cotton pickers from the White Nile. The local inhabitants, better housed, clothed, and fed, were less affected. In April and May, malaria became more general and large numbers of the local inhabitants came under treatment.

A great deal of leakage took place from the canals, and many anopheline infections occurred from this cause. These leakages are being dealt with by general strengthening of canal banks. Anopheline infections in January, February and March were 80% above the average, and this increase and the consequent malarial outbreak was attributed mainly to incomplete drying out of the field channels, owing to inadequate baling arrangements. This is a matter which can be remedied by organisation and supervision.

It is noteworthy that more than 50% of the admissions for malaria took place during the dry months of February, March, April and May. Almost all the cases were of the benign tertian type; malignant tertian has been rare in this area during the last two years.

The sanitary staff for the irrigated area working under the Medical Inspector is:—

- 1 British Sanitary Inspector,
- 3 Native Sanitary Overseers,
- 11 Mosquito searchers.

In addition there are 19 sanitary hakims, each with a hospital attendant under him, in charge of small dispensaries distributed over the irrigated area who are also responsible for reporting any leakages or mosquito infections occurring in their 15,000 acre areas.

## (2) **SANITATION OF THE GEZIRAH IRRIGATED AREA.**

The Gezirah irrigation scheme has now been working for one and half years.

It is, therefore, useful to consider what has been and what is likely to be the effect of this irrigation scheme on the health of the population generally.

The essential factor affecting health in this area at the present time is malaria.

### **Malaria.**

Malaria may occur:—

(1) During the rainy season, owing to flooding of the country side by heavy rains.

(2) At other times of the year owing to defects in the construction or maintenance of the canals.

### **Malaria during the Rainy Season.**

During and immediately after the rainy season—if the rains are good—the whole Gezirah, including the irrigated area, becomes malarious.

In the case of the irrigated area, however, this malarious condition is being mitigated and will be further mitigated by the following factors:—

(1) A small dispensary in charge of a sanitary hakim and a hospital attendant has been placed in each 15,000 acre block, to issue quinine and to afford immediate treatment to malarious patients, and to report anopheline infections to headquarters.

(2) Owing to better roads it will be possible to take general anti-mosquito measures at an earlier date than elsewhere in the Gezirah.

(3) The increased use of mosquito nets in this area.

(4) The increased resistance of the tenant population owing to better food and a higher standard of living.

(5) Later as funds become available it should be possible to construct drains, to drain at any rate the lower lying parts of this area.

Thus although the whole of the Gezirah area becomes malarious as a result of a good rainy season yet certain precautions are being taken which will tend to diminish the incidence of malaria in the irrigated area and later it may be possible to establish effective drainage for this area.

### **Malaria during the Dry Season.**

During the dry season malaria is caused by mosquito breeding due to faulty maintenance of the canals.

If canals are properly constructed and properly maintained and if the field channels are effectively dried out, where necessary by pumping or baling, there should be no malaria during the dry season. This has not been the case during the year under consideration.



To obviate this in the future certain observations and recommendations have been made as to the construction and design of canals. It is understood that the points in question will be attended to in any extension of the irrigated area, and that steps are being taken to remedy the defects in the existing canalisation.

It would appear from what has been said above that if certain defects in the construction of canals can be remedied and if greater attention is paid to the complete drying out of the field channels there is no reason why this area should not be kept free of malaria during the eight or nine dry months of the year. If, however, the present structural defects cannot be remedied and if a carefully observed routine of drying off field channels cannot be established then we shall have to anticipate a definite deterioration in the standard of health of the population of this area.

### (3) IRRIGATED AREA — BILHARZIA.

The following canals in the irrigated area have been found to harbour bilharzia snails :—

Barakat canals	Bullinus
Tayiba „	„ and Planorbis
Abdel Hakim canals	Bullinus
Heleiwa „	„
Alim El Hoda „	„
Medina „	„

No bilharzia snails have been found in any of the other canals up to date but the search has not been sufficiently thorough to exclude their presence. Intelligent natives have been especially trained in the Wellcome Tropical Research Laboratories for this work and a careful survey of all canals is being proceeded with.

As a result of the bilharzial population survey in this area, carried out in November and December, 1926, it was found that 76 persons, born and bred in the irrigated area, were infected with bilharzia. Of these, 39 were men, and 37 were boys. Some or all of the 39 men may have been infected elsewhere, but it may be assumed that the 37 boys were infected in this area, and for the most part in the blocks in which infected boys were found :—

Hosh ... ..	7	Tayiba ... ..	8
Hamad El Nil ...	3	Barakat ... ..	15
Komr and Fadma	3	Abdel Rahma ...	1

Bilharzial snails have been found in two of these blocks up to date, but it is probable that with further search their presence will be found in the other four blocks.

It is thus seen that the canals of 6 out of the 20 blocks are probably to some extent infected with bilharzia, and that bilharzial snails have already been found in the canals of two blocks and further search will probably reveal their presence in many of the other blocks. In any case, it is a matter of time before all the canals are infected with these snails.

The bilharzial population survey showed that 941 persons infected with bilharzia were working in the irrigated area. These were all treated and cured, but others will take their places unless infected persons can be prevented from entering this area.

The question arises then as to whether once these canals become infested with bilharzial snails it will be possible to prevent a widespread infection of the canals. It is hoped to do this by adopting the following measures :—

- (1) Curing all the local inhabitants who are infected.
- (2) Examining all the westerners crossing the White Nile to work in the Gezirah, and detaining for treatment all those found to be infected.
- (3) Keeping a constant watch for infected persons who have entered the district, either westerners who have escaped detection on the White Nile, or persons from other infected parts of the Sudan.
- (4) By preventing, in every way possible, persons from defaecating or urinating in or near canals, or from bathing in canals.
- (5) By drying off the small distributary canals during the non-watering season, and by the free use of molluscicides wherever they can be effectively employed.

During the ensuing year it will only be possible to dry off somewhat over a half of the small distributary canals.

The drying off of the other half, owing to peculiarities of position or design would involve considerable additional expenditure. These will be treated with molluscicides.

Thus, although some of the canals are already lightly infected, yet by the methods outlined above it is hoped to prevent further infection of the canals and to eliminate the disease from those already infected.

It must be recognised, however, that the position is a serious one and calls for energetic and carefully executed measures.

#### (4) **THE SENNAR DAM RESERVOIR.**

This reservoir has introduced a serious sanitary complication into the southern Sennar merkaz and the northern Fung Province. Fortunately the country which is affected by this reservoir is not very thickly populated, but the sanitary condition of Singa itself and of some 52 villages is likely to be affected.

The reservoir when full extends south from the dam for a distance of 79 miles, but true reservoir conditions do not extend far south of Singa, a distance of 58 miles from the dam.

Instead of a flowing river with, for the most part, sloping banks of caked mud there is now for 60 miles a large expanse of stationary water which finds its way up the shallow khors and in many places lies in long grass or thick under-growth. Ideal conditions for mosquito breeding thus exist.

Mosquito breeding is at its worst as the reservoir fills and the water finds its way into the long grass not yet dried off, and again when the level of the reservoir falls and large areas of shallow water are left detached from the river and which in turn break up into scattered pools.

It is impossible, at any reasonable cost per head of the population concerned, to render this area anopheline mosquito free. The only method of dealing with the situation (except in the case of Singa town) is to move the villages back from the reservoir.

As regards Singa town the circumstances are different. There is no question of moving the town so that adequate measures will have to be taken to protect it from the effects of the altered conditions. The town is affected in two ways:—

- (1) **Mosquito breeding.** On the Singa side the bank is high, but the large expanse of almost stationary water overflows the shallower bank on the



opposite side. One long bifurcating khor has been cleared and canalised, but much remains to be done,

(2) **Water supply.** The main water supply of the town has always been the river, but now water is drawn from a shallow, almost stagnant lake freely fouled above and below the town instead of as before from a flowing river.

A good supply of well water is being provided for the use of officials, but this provision will have to be extended to meet the needs of the town generally.

#### (5) **SANITATION, PORT SUDAN.**

The disposal of sewage which presents a problem of great difficulty in this town is receiving careful consideration. Up to the present the bulk of the sewage has been emptied into iron barges and dumped out to sea. The continuance of this system has now become inadvisable owing to the undesirable situation of the quay at present used for this purpose and the non-existence of a more suitable site for this purpose.

Disposal of the sewage outside the town is at present out of the question as the town is built on a coral reef which is separated from the surrounding country by khors which may become impassable to wheeled traffic for several days together during the rainy season. Thus until such time as it is possible to bridge one of these khors so as to ensure permanent transit it will be necessary to deal with the sewage on the reef, i.e. in the town area.

To meet this situation the following measures are being taken :—

(1) With the establishment of a piped water supply, water closets discharging into septic tanks are being installed in the European houses. The results so far have proved very satisfactory.

(2) The great majority of houses are native houses which for one reason and another do not admit of the water closet system. These houses still have to be served by earth closets and to dispose of the contents of these buckets it is proposed to build a large destructor suitable for the disposal of dry sewage at the edge of the reef at a suitable distance from the inhabited area.

The extreme humidity of the atmosphere at Port Sudan complicates, while it renders additionally important, the satisfactory solution of this problem.

**Water supply.** A piped water supply was first introduced at Port-Sudan in 1925 on an experimental scale. The pipe line has since been doubled and the supply is to be further increased early in 1927.

The supply, which is taken from a natural subterranean reservoir in the mountains some 20 miles from Port-Sudan, is an excellent one.

#### (6) **SANITATION AND PUBLIC HEALTH. VITAL STATISTICS.**

A new system for the collection of births and deaths statistics was put in force in the Blue Nile Province in the early part of 1926.

In the northern and central Sudan the duty of reporting births and deaths rests with the maazoons, who are persons appointed by the Legal Department to register marriages, divorces, etc. They receive one piastre for every birth or death they report. This system appears to be adequate in Khartoum. Berber and Dongola Provinces and Wadi-Halfa markaz where the number of maazoons is such as to ensure that they do not have to collect statistics of births and deaths from an impossible number of villages, or to travel

excessive distances to bring in their reports. It may be said that the births and deaths from these northern provinces are approximately correct.

As regards the central Sudan, the state of affairs is entirely different. The birth and death registration figures are so incomplete as to be valueless. The maazoons in some cases have to deal with so many villages at such distances from the merkaz towns that it is a physical impossibility for the most energetic man to visit every village during the month. In some cases in Kordofan a maazoon has to deal with two or three Omodiahs each Omodiah comprising as many as 60—90 villages.

To meet this difficulty in the Blue Nile Province, the maazoons were relieved of this duty which they had neither the time nor the authority to fulfil, and the responsibility was thrown on the omdas (head sheikhs) who through their larger number and greater authority were in a better position to obtain the statistics, while to recompense them for this additional burden, the fee for every birth or death recorded was increased from one piastre to two piastres. As a result of this re-arrangement of duties the accuracy of the returns received in this province has been very greatly increased.

It is desired to extend this new system of collection to Kordofan and the White Nile Province in the near future.

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## REPORT ON THE HEALTH AND SANITATION

OF

KHARTOUM, KHARTOUM NORTH AND OMDURMAN,

1926.

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### GENERAL.

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Since it has been decided that future reports shall cover the period from January to December, the present includes the period of fifteen months, i.e. from October 1st, 1925 to December 31st, 1926.

During the period under review, the general health of the population has been satisfactory, except for a marked increase in the enteric type of disease, namely the dysenteries and typhoid fever. The unusual incidence of this type of disease is very largely attributable to an unusually low rainfall for the second successive year, being for the fifteen months 88.6 millimetres only or 95.1 millimetres lower than the average for the past twenty one years. The staple food of the natives, millet, was exceedingly short and the price correspondingly high. Most of the cases occurred in Omdurman, where the water supply is from wells and where pit latrines are used by the majority of the population.

The incidence of the primary cases of malaria has been satisfactorily low, being less over the period of fifteen months than it was in the previous year. The very large number of relapses are almost invariably those contracted outside the province which received inadequate treatment owing to their being unable or unwilling to remain long enough for thorough treatment.

An outbreak of chicken pox occurred in the spring, only a small proportion of the cases being notified, as the natives treat the disease lightly and do not report to hospital.

Sand fly fever attacked a number of British troops in barracks, probably attributable to the building operations which have been going on in the barracks throughout the year.

The general sanitation of Khartoum and Khartoum North continues to be satisfactory, certain improvements have been sanctioned and are in the course of completion; these include a new fish market, cement paving round the meat market and a new block of rooms for the conservancy staff in Khartoum. A new meat market has been erected in Khartoum North to replace the dilapidated mud building existing.

The sanitation of Omdurman still leaves much to be desired; but improvements continue annually. During the period under review the meat market has been protected with expanded metal fencing, a further sum of money was allotted for filling in pits and this most useful work has been carried on throughout the period. The greatest advance in Omdurman has been the installation of electric light and a pure water supply; the latter only became available in December 1926, but large numbers of applications have already been made for private installation and the Municipality are putting up a number of public fountains for the sale of water. It is intended gradually



to close a number of wells and a marked improvement in the health of the population may be anticipated when the purified supply becomes more widely used. The supply is drawn from the Nile and purified by a Patterson Filter Plant in conjunction with a Chloronome.

Two distinct advances have been made in the Rural District, which are bound to have a beneficial effect on the health of the people. Firstly a British sanitary inspector has been appointed to tour the irrigated areas, and to control mosquito breeding. This work is of considerable importance in view of the increased demand for pumping licences; these farms are generally carelessly run leading to a great deal of mosquito breeding and malaria. Secondly, a dispensary hakim has been appointed to Geili district and the dispensary there brought up to an excellent standard. The attendances here have more than trebled in the few weeks he has been there and have brought to light the large number of chronic cases of malaria which exist in that part of the district.

The dust nuisance in a country like the Sudan must always be an insurmountable problem, but in Khartoum as in other centres of European population, much can be done by irrigation to improve local conditions. Various schemes have been submitted from time to time but financial considerations have been the main preventive to advancement on these lines. An old scheme for irrigation of Khartoum from a point to the south east of the town has been resubmitted. This would enable trees to be grown in the streets and gardens to be irrigated for a very large part of the population; there is a natural slope back to the river from the railway line which would facilitate drainage. Such a scheme would also open up a healthy area for the building of better class European houses.

#### (1) HOUSING.

European housing conditions continue satisfactorily but new areas for government houses are still hard to find. A scheme for the development of a low lying area between Mogren point and the railway extension was submitted to the Central Sanitary Board who were, however, unable to recommend this site. The demand for better class native houses has not been very great and is not likely to increase since the completion of the bridge to Omdurman in 1927 together with the electrification of the trams will send many to Omdurman where the cost of living is considerably lower.

A beginning has been made towards clearing many of the undesirable, crowded insanitary native hoshes in Khartoum; during the year twenty nine such properties were closed down; overcrowding and filth should not be permitted to exist in Khartoum where better class people live in close proximity to these conditions.

Flies have not been unduly bad in Khartoum but this has only been possible by continued house to house inspections and the untiring supervision of the British sanitary inspectors.

#### (2) LEGISLATION.

No new legislation in the interest of public health has been introduced during the period.

#### (3) STAFF.

The following changes in the British sanitary inspector staff have taken place:—

Mr. Kerrison, S.I.	was transferred to the Municipal Engineer's branch on 1.3.26.
Mr. Walker,	Sanitary Inspector Omdurman was invalided on 10.7.26.
Mr. Vair,	Sanitary Inspector, was appointed on 7.12.25. and is now in charge of the Rural District.
Mr. Duncan,	Sanitary Inspector, was appointed on 15.8.26.
Mr. Edwards,	Sanitary Inspector, was appointed on 14.11.26.



The population of the province is estimated at 198,754, made up as follows :—

District	Men	Women	Children	Total
Khartoum ... ..	10,700	9,564	10,520	30,784
Khartoum North ... ..	4,885	5,943	5,495	16,323
Omdurman... ..	24,225	26,396	28,916	79,537
Rural District ... ..	21,339	27,052	23,719	72,110
Total ... ..	61,149	68,955	68,650	198,754

Of the above, the following are non natives of the Sudan :—

	Khartoum	Khartoum North	Omdurman	Total
Indians.				
Men ... ..	23		26	49
Women ... ..	24		9	33
Children ... ..	56		24	80
Egyptians.				
Men ... ..	853	119	117	1,089
Women ... ..	804	95	72	971
Children ... ..	1,304	137	232	1,673
Europeans and Americans.				
Men... ..	981	112	131	1,224
Women ... ..	807	42	114	963
Children ... ..	937	66	142	1,145
Other Non-Natives.				
Men ... ..	1,476	74	234	1,784
Women ... ..	944	30	78	1,052
Children ... ..	859	42	72	973
Total ... ..	9,068	717	1,251	11,036

#### (4) BIRTHS AND DEATHS.

4,694 births and 2,614 deaths were registered during the period under review, showing an excess of births over deaths of 2,380. The appended table shows the relationship of birth and death rates to the populations of each locality per 1,000 :—

	Population	Births	Birth Rate	Deaths	Death Rate
Khartoum ...	30,784	769	24.98	445	14.45
Khartoum North	16,323	531	32.53	287	17.58
Omdurman ...	79,537	1,891	23.77	969	12.18
Rural District ...	72,110	1,503	20.84	913	12.66
	198,754	4,694	23.66	2614	13.13

148 still births were also registered in the four localities during this period.

The infantile mortality for the three towns was 60.16 per 1,000 births and in each town was as follows :—

	Per 1,000 births
Khartoum ... ..	63.71
Khartoum North ... ..	41.43
Omdurman ... ..	64.01

According to nationalities the infantile mortality was :—

Europeans ... ..	122.21	per 1,000 births.
Egyptians and Syrians ...	62.50	„ „ „
Natives of the Sudan ...	60.01	„ „ „
All others ... ..	17.85	„ „ „

(5) BIRTHS RECORDED BY MONTHS LOCALITIES AND SEXES.

Month	Khartoum		Omdurman		Khartoum North		Rural District		TOTAL		Still Births	
	M	F	M	F	M	F	M	F	M	F	M	F
October 1925 ...	28	25	59	59	18	21	51	39	156	144	6	2
November ...	35	28	66	66	11	13	50	53	162	160	3	2
December ...	28	26	60	65	17	21	62	47	167	159	10	8
January 1926 ...	27	20	70	80	11	23	26	33	134	156	5	5
February ...	25	18	55	61	12	18	68	56	160	153	6	3
March ...	27	19	47	61	15	21	62	45	151	146	8	4
April ...	16	29	63	62	17	14	58	60	154	165	9	
May ...	29	17	61	67	19	20	53	55	162	159	2	5
June ...	25	18	74	52	19	8	39	49	157	127	7	4
July... ..	27	33	53	70	17	10	49	78	146	191	8	6
August ...	25	29	75	78	28	16	45	47	173	170	4	1
September ...	22	18	54	55	11	16	62	54	149	143	8	3
October ...	20	30	63	65	18	12	30	30	131	137	2	3
November ...	39	34	62	67	34	15	49	79	184	195	11	4
December ...	31	21	62	59	30	26	46	28	109	134	5	4
Total	404	365	924	967	277	254	750	753	2355	2339	94	54
	769		1891		531		1503		4694		148	

					Still Births		
			M.	F.	Total	M.	F.
Khartoum	...	...	404	365	769	13	14
Khartoum North	...	...	277	254	531	15	4
Omdurman	...	...	924	967	1891	29	24
Rural District	...	...	750	753	1503	37	12
			—	—	—	—	—
Total	...	...	2355	2339	4694	94	54



(6) BIRTHS RECORDED BY NATIONALITIES, LOCALITIES AND SEXES.

Nationality.	Khartoum		Omdurman		Khartoum North		Rural District		Total		Still Births	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
British ... ..	3	2	—	—	—	1	—	—	3	3	—	—
Greek ... ..	10	7	—	—	—	—	—	—	10	7	1	1
Other Europeans	6	3	—	1	—	—	—	—	6	4	—	—
Egyptians & Syrians	92	89	26	33	29	35	—	—	147	157	1	5
Natives of Sudan	290	260	884	922	240	202	750	753	2164	2137	92	47
All Others... ..	3	4	14	11	8	16	—	—	25	31	—	1
Total ... {	404	365	924	967	277	254	750	753	2355	2339	94	54
	769		1,891		531		1,503		4,694		148	

(7) DEATHS RECORDED BY MONTHS, LOCALITIES AND SEXES.

Month			Khartoum		Omdurman		Khartoum North		Rural District		Total	
			M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
October, 1925	...	...	15	12	23	34	8	5	23	24	69	74
November, ...	...	...	11	11	24	25	9	9	28	19	72	64
December, ...	...	...	21	12	33	28	7	11	39	30	100	81
January, 1926	...	...	19	12	31	45	5	13	17	17	72	87
February ...	...	...	18	15	24	48	8	7	40	38	90	108
March ...	...	...	10	15	25	36	9	8	32	36	76	95
April ...	...	...	21	13	26	14	5	9	28	42	80	78
May ...	...	...	23	19	27	44	14	11	31	38	95	102
June ...	...	...	20	16	34	29	11	11	23	32	88	88
July ...	...	...	11	9	38	32	9	12	34	36	92	89
August ...	...	...	19	24	33	53	7	15	34	42	93	134
September ...	...	...	16	13	36	42	8	11	31	32	91	99
October ...	...	...	14	14	32	33	11	8	19	23	76	78
November ...	...	...	11	10	32	25	6	16	35	37	84	88
December ...	...	...	7	14	23	40	11	13	24	29	65	106
Grand Total ... {			236	209	441	528	128	159	438	475	1243	1371
			445		969		287		913		2,614	





(9) DEATHS RECORDED BY NATIONALITIES, TOWNS AND MONTHS IN CHILDREN UNDER FIVE YEARS.

	Khartoum				Omdurman			Khartoum North			Total		
	British	Greek	Egyptians & Syrians	Natives of the Sudan	Egyptians & Syrians	Natives of the Sudan	All others	Egyptians & Syrians	Natives of the Sudan	All other			
0-1:1-5	0-1:1-5	0.1:1.5	0.1:1.5	0.1:1.5	0.1:1.5	0.1:1.5	0.1:1.5	0.1:1.5	0.1:1.5	0.1:1.5			
October ...	—	1	—	3	1	4	6	—	—	2	4	—	21
November ...	—	—	1	1	2	5	3	—	—	2	1	—	15
December ...	—	1	1	3	2	8	5	—	—	1	2	—	23
January ...	—	—	2	1	1	6	8	—	—	—	3	—	21
February ...	—	—	2	3	3	4	5	—	—	—	3	—	20
March ...	—	1	1	3	2	9	6	—	—	1	2	—	25
April ...	—	—	1	1	4	2	4	—	1	—	4	—	17
May... ...	—	1	2	2	3	7	11	—	2	—	8	1	38
June ...	1	—	1	3	3	10	7	1	—	2	3	1	31
July... ...	—	—	1	1	—	12	6	—	1	1	5	—	27
August ...	—	—	2	5	1	12	12	—	—	1	7	—	41
September ...	—	—	—	3	2	20	1	—	—	1	8	—	37
October ...	—	1	1	3	—	3	15	—	—	1	9	—	32
November ...	—	—	—	2	—	9	7	—	—	1	9	—	30
December ...	—	—	1	2	2	8	7	—	1	3	6	—	29
Total ...	Nil	4 : 1	12 : 6	33 : 26	1	119 : 103	1	Nil	6 : 2	16 : 74	Nil	2	407

(10) COMMUNICABLE DISEASES.

TABLE 1.

Showing Number of Cases Notified.

DISEASE	Khartoum Local	Khartoum North Local	Omdurman Local	Total of Local Cases	Imported Cases	Relapsed Cases	Total
Chicken Pox ... ..	207	44	96	347	6	—	353
Diphtheria ... ..	16	5	3	24	1	—	25
Meningitis Acute ... ..	—	—	1	1	—	—	1
„ Pneumococcal ... ..	1	—	—	1	—	—	1
Ankylostoma ... ..	11	—	5	16	35	—	51
Bilharzia ... ..	38	12	30	80	110	1	191
Black Water Fever... ..	—	—	—	—	2	—	2
Dysentery ... ..	98	58	127	283	37	47	367
Typhoid Fever ... ..	6	7	36	49	8	—	57
Kala Azar ... ..	—	—	—	—	2	—	2
Leprosy ... ..	2	2	1	5	16	—	21
Malaria ... ..	11	28	1	40	37	503	580
Malta Fever ... ..	1	—	—	1	—	—	1
Measles ... ..	23	6	10	39	3	—	42
Mumps ... ..	29	12	1	42	5	—	47
Phlebotomus Fever ... ..	111	1	—	112	—	—	112
Puerperal Fever ... ..	4	1	6	11	—	—	11
Scabies ... ..	—	3	4	7	2	—	9
Soft Sore ... ..	43	14	1	58	13	—	71
Syphilis ... ..	371	16	262	649	23	55	727
Tuberculosis, Pulm... ..	21	13	18	52	47	—	99
Whooping Cough ... ..	—	—	3	3	—	—	3
Grand Total ... ..	993	222	605	1820	347	606	2773



(11) COMMUNICABLE DISEASES.

TABLE II.

Showing Number of cases by month and place.

Key:— K.—Khartoum ; KN.—Khartoum North ; O.—Omdurman ; L.—Local ; I.—Imported ; R.—Relapsed cases.

Diseases	Dist.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Grand Total
Diphtheria	K.	1	1	2	2	1				1			2	1	2	3	16	25
	KN.			2		1										2	5	
	O.				1										1	1	3	
	I.	1															1	
Dysentery...	K.	1		7	6	4	9	3	13	12	16	9	5	4	3	6	98*	367
	KN.	4	10	4	5	2	1			4	14	4	1	2	4	3	58	
	O.	6	1	5	4		6	7		14	34	3	9	9	6	16	127	
	I.	3	6	8	4	1			2	2	6	1		1	1	2	37	
	R.	8	5	2	1	1	1		2	6	13	6			1	1	47	
Typhoid Fever	K.								4			1	1		1	1	6	57
	KN.									1	2		2				7	
	O.								1		4	1		16	6	8	36	
	I.	2							1		2			1	1	1	8	
Malaria	K.				2	1	1	3	1		2	1					11	580
	KN.		2	3	4	1	1	9	8								28	
	O.	7	4	2	8	3	2	2			3	2	1	2	1		37	
	I.	1															1	
	R.	21	20	17	16	26	19	45	34	40	42	27	29	40	73	54	503	
Tuberculosis Pulmonary	K.	1	2	2	1		3	3	1		1	3	1	1	2		21	99
	KN.		1	1		1	4	2	1		2				1		13	
	O.	2	1		1	3	2		3	1	2	1		2			18	
	I.	3	2	4	2	1	7	3	3	3	6	3	2	2	2	4	47	





# COMMUNICABLE DISEASES.

TABLE II.—(Continued)

Disease.	Dist.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Grand Total
Mumps .. ..	K. KN. O. I.	2	1 2	4 2	2 2 1	4	1 2 5	8 1	1			3	4		1	1	B.F. 1909 29 12 1 5	
Scabies .. ..	KN. O. I.		1 1	3	1			1	1								3 4 2	9
Soft Sore .. ..	K. KN. O. I.			5 1	1 1	6 2	3	2	5 4	5	2	2		7	5	5	43 14 1 13	71
Syphilis .. ..	K. KN. O. I. R.		3 2 6 7 2	2 6 15 2 10	13 7 15 6	24	13 12 5	10 20 2	24 26 3	31 1 23 1	68 24 6	43 16	50 14	48 17	26 18	16 19 12	371 16 262 23 55	727
Meningitis, Pneumococcal	K.						1										1	1
Meningitis, Acute	O.													1			1	1
Black Water Fever	I.					1				1							2	2
Kala Azar.. ..	I.		1			1											2	2
Malta Fever ..	K.				1												1	1
Whooping Cough..	O.			3													3	3
Grand Total 2773																		

## (12) MALARIA.

It is gratifying to note that the incidence of primary malaria infections in the three towns has been less over the period of fifteen months than it was in the previous year.

Although we are to a large extent indebted to the very poor rains for this low incidence, it must be fully realised that apart from rains there are always a large number of potential sources of infection in and around the three towns such as river pools, wells and irrigation farms which require the untiring supervision of the British and Native sanitary staff.

Tuti Khor gave rise to some anxiety during the winter months as experiments at the Makwar Dam caused drainage work in this Khor to be repeatedly flooded; a large staff of labourers had to be employed to clear the native cultivation which was damaged by the frequent floodings.

The Sunt Forest again needed a great deal of treating and draining of pools; between September 20th and October 28th 1926 seventy infected pools were detected. Although a large amount of thinning has been carried out during the year in this forest, more is still required to ensure easy access to all parts of it. As the trees grow up the danger of mosquito breeding will be reduced, but it is hoped that coppicing will never be permitted here. Approximately £E. 60 was spent this year in labour and larvicide at this forest alone. The larvicide found to be most convenient here is a mixture of paraffin and a coal tar disinfectant; Paris Green has been tried in a few localities but the British and native staff prefer to use the above mentioned mixture.

Of the 580 cases notified during the period under review 40 only were considered to be locally contracted as against 70 in 1925 and 51 in 1924. These primary cases were notified as follows:— Khartoum 11, Khartoum North 28, Omdurman 1.

The relapsed cases numbering 503 against 88 last year are those reporting to the hospitals in the three towns having a clear history of previous attacks either contracted in the Rural District or in other provinces of the Sudan.

The great increase of these cases reported is the result of a special request to all hospitals to report such cases on a monthly return; in my last report it was remarked that far more relapsed cases probably occurred; this has been amply justified.

Among the British troops there occurred 92 cases of malaria of which 15 were locally contracted. 31 cases were malignant tertian and 60 benign tertian and one case had both parasites.

As the average number of British troops was 1,393, the incidence was 1.1 %.

Two imported cases of blackwater fever were notified, 1 case in February and 1 in June; these were contracted at Mongalla and Atbara respectively.

## (13) THE DYSENTERIES.

There were 367 cases of these diseases notified from the three towns during the fifteen months; no figures are available for the Rural District. Of these cases 279 were amoebic and 88 bacillary infections.

By comparison with last year's figures, the increase would at first appear somewhat alarming, but although there has undoubtedly been some increase among Europeans particularly of the mild Hiss and Russell type of bacillary dysentery, the chief cause of increase is due to very much better returns from the hospitals. It must also be borne in mind with regard to native cases that this has been the third consecutive year of poor rains and high food prices resulting in a general lowering of their resisting powers; a very large number of natives harbour amoebae but do not, as a rule, report at hospitals until and unless their symptoms become severe.



Flies have not been unduly bad in the three towns, but although the conservancy system in Khartoum and Khartoum North is considered the most suitable for these towns, few people cover the night soil adequately and every bucket is a potential source of infection. In Omdurman, where pit latrines are often shallow and in close proximity to wells, dysenteric diseases are only too readily disseminated.

### Amoebic Dysentery.

			1926	1925
Locally contracted	...	...	215	97
Relapsed	...	...	39	
Imported	...	...	25	18
Total notified	...	...	279	115

**Sexes:**—Males 204—Females 33, Undefined 42.

### Nationalities.

British	...	...	...	13	7
Other Europeans	...	...	...	5	2
Egyptians and Syrians	...	...	...	11	16
Natives of the Sudan	...	...	...	198	90
Undefined	...	...	...	52	

### Age Periods.

1 : 10	10 : 20	20 : 30	30 : 40	40 : 50	50 : 60	Over 60	Undefined.
4	27	110	46	21	8	5	58
Central Prison Cases 8							

### Bacillary Dysentery.

				1926	1925
Locally contracted	...	...	...	68	10
Relapsed	...	...	...	8	
Imported	...	...	...	12	25
Total notified	...	...	...	88	35

### Nationalities.

British	...	...	...	31	8
Other Europeans	...	...	...	5	1
Egyptians and Syrians...	...	...	...	6	2
Natives of the Sudan	...	...	...	46	24

### Age Periods.

1 : 10	10 : 20	20 : 30	30 : 40	40 : 50	50 : 60	Over 60	Undefined.
6	3	36	17	12	4	1	9

### Type of Organism:—

Shiga	...	...	...	...	13
Flexner	...	...	...	...	40
Hiss and Russell	...	...	...	...	35

20 of the above cases occurred in the Central Prison.

## (14) TYPHOID FEVER.

There has been some general increased incidence of this disease throughout the Sudan, but the main increased incidence has occurred in Omdurman and Khartoum North.

There were no cases in 1926 in the three towns until May, when there were 4 cases in Khartoum and 1 case in Omdurman. There were sporadic cases in these three towns until October, in which months a mild epidemic began in Omdurman; there were in October 16 cases, in November 6 cases and in December 8 cases.

57 cases were notified in the three towns during the period under review. 49 cases of which were locally contracted and 8 imported. These occurred among 33 males and 24 females.

The nationalities affected were:—

British	...	...	...	...	...	2
Greek	...	...	...	...	...	2
Egyptians and Syrians	...	...	...	...	...	9
Natives of the Sudan	...	...	...	...	...	44

The age incidence was:—

1 : 10	...	...	...	...	...	16
10 : 20	...	...	...	...	...	21
20 : 30	...	...	...	...	...	15
Undefined	...	...	...	...	...	5

All these cases shewed a positive agglutination of 1 in 40 or in higher dilutions, but a number of clinical cases occurred in which no laboratory confirmation was obtainable.

Five deaths occurred in Omdurman from definitely positive cases, 9% mortality; a few other deaths occurred in cases not diagnosed typhoid but which clinically resembled the disease. Two deaths occurred in Khartoum cases and one from Khartoum North.

In endeavouring to trace the origin of this epidemic in Omdurman, the usual lines of investigation have been followed. Previously notified cases have been examined in search of carriers; milk has been examined as also have several milk sellers; also all contacts living in the same houses; none of these have provided any evidence of the source.

The cases have occurred in widely separated parts of Omdurman, but the general trend of the spread has been from south to north.

Flies which are always bad in Omdurman have not been worse than usual. There are in Omdurman hundreds of pit latrines as well as some 800 shallow wells, many of which are in close proximity to each other; some of the people drink water from wells, others directly from the river; but cases of typhoid fever occurred in both classes of people. A point of interest in connection with the wells is the fact that the White Nile reached its highest point about September 10th and then began to fall away thereby lowering the level of water in the wells; the majority of cases occurred in October. The rainfall in 1926 was 83 m.m., the lowest there has been for many years, and food prices were very high; both these have been contributory factors.

**Prophylaxis.** In October notice was given to all sheikhs in Omdurman of the presence of the disease, warning people to boil water and milk and to report all suspected cases. As soon as vaccine became available, preventive inoculations were carried out and are still continuing. All contacts were inoculated and all school children in government and private schools, as well as the police. A total of 1,122 protective inoculations was carried out up to the end of December, and more are being continued.



The disease shows definite signs of dying down, but it must always be a danger so long as the present pit latrines and wells continue to exist. The purified water supply for the town was available late in December and many hundreds of applications for its installation into private houses have been submitted. As these installations are completed more wells will be closed down, but it will be some years before all the wells are abolished in Omdurman.

Pit latrines are inevitable in a town of this nature as the expense of maintaining a bucket system is at present insuperable. All the better class natives are encouraged to install bucket latrines wherever possible and close their pit latrines; but the demand for this is slow.

## (15) DIPHTHERIA.

There were 25 cases of this disease notified during the period compared to 12 cases in the previous twelve months; for the same period as that covered by the previous report there were 15 cases or an increase of 3 only. The cases occurred in the last three months of the year, three of which occurred among men of the transport lines of a regiment newly arrived from India, from a locality where diphtheria was said to be very prevalent. It was at first thought that possibly the cases were contracted from an infected animal in the lines, but this was disproved by veterinary examination.

Of the 25 cases notified 24 were locally contracted and one imported from outside the province, exclusive of the possibility of the importation by the regiment which came from India.

<b>Localities.</b>	Khartoum ...	...	16
	Khartoum North ...	...	5
	Omdurman ...	...	3
	Imported ...	...	1
<b>Nationalities attacked :</b>	British ...	...	6
	Other Europeans ...	...	2
	Egyptians and Syrians		8
	Sudanese ...	...	9
<b>Age Periods :—</b>	Under 1 ...	...	1
	1 : 5 ...	...	6
	5 : 10 ...	...	5
	10 : 20 ...	...	4
	20 : 30 ...	...	5
	30 : 40 ...	...	2
	Undefined ...	...	2

**Deaths Notified:—** 4 giving a case mortality of 16%.

One death occurred among the British troops from cellulitis of neck and heart failure complicating nasal diphtheria.

**Schick Tests:—** During the past year material was obtained from England for the purpose of carrying out a number of tests with a view to ascertaining the susceptibility of native children. A number of students at the Gordon College and a few patients and staff at the Khartoum Civil Hospital were tested. Some of these were carried out in conjunction with Dr. Riding, M. D., Pathologist, W. T. R. Laboratories.

Tests carried out	...	...	...	...	104
Schick positive ...	...	...	...	...	27
Doubtful Pseudo	...	...	...	...	14
Schick negative ...	...	...	...	...	63

The average age of those tested was approximately 16 years. It was found extremely difficult to estimate the results owing to the deep pigmentation of the skin of most of those tested, but in certain of the more fair skins the results were more easily defined. From the results obtained it would appear that the population at about the higher school age has a large degree of immunity to diphtheria. It is hoped later to test a number of children under 10 years of age.

# (16) PULMONARY TUBERCULOSIS.

A further increase in the notification of this disease has to be reported here. There were 99 cases notified compared to 52 cases in 1925 and 46 cases in 1924. Over an equal period of twelve months the general increase was 33 or 65% and local increase 14 or 43%. The notifications show that the increases are reported from Khartoum 6, Khartoum North 11, Omdurman 3, Imported cases 27.

## Nationalities attacked:—

British	...	...	...	...	...	1
Greek	...	...	...	...	...	4
Egyptian	...	...	...	...	...	1
Natives of the Sudan	...	...	...	...	...	91
All others	...	...	...	...	...	2

Of all cases notified 79 were males and 20 females.

## Age Periods:—

10 : 20	...	...	...	...	...	4
20 : 30	...	...	...	...	...	51
30 : 40	...	...	...	...	...	21
40 : 50	...	...	...	...	...	5
50 : 60	...	...	...	...	...	9
Over 60	...	...	...	...	...	7
Undefined	...	...	...	...	...	2

In following up the cases to the end of the year it was found that 49 had died, 30 had left the province, 11 still remaining and 9 could not be traced. Case mortality 50%.

Of the cases which were contracted outside the Province, it is of interest to note the localities from which the cases came.

India	...	...	...	...	...	1
Greece	...	...	...	...	...	2
Egypt	...	...	...	...	...	3
Berber Province	...	...	...	...	...	6
Dongola Province	...	...	...	...	...	4
Port Sudan...	...	...	...	...	...	1
Geteina	...	...	...	...	...	1
Sennar	...	...	...	...	...	1
Kosti	...	...	...	...	...	1
Blue Nile Province	...	...	...	...	...	17
Mongalla	...	...	...	...	...	1
Darfur Province	...	...	...	...	...	1
Kordofan Province...	...	...	...	...	...	3
Bahr El Ghazal Province	...	...	...	...	...	1

The conditions of living among the natives of the province have not materially altered in the past year, nor have the medical facilities increased to the extent that the incidence of pulmonary tuberculosis has, so one is inclined



to attribute the large increase to the great scarcity of staple foodstuffs following on the third successive year of poor rains.

### (17) BILHARZIA.

There were 191 cases of bilharzia reported in the various hospital returns, of these 60 were considered to have been locally contracted.

With the exception of last year, this disease has not been included in the notifications recorded in this report. It is, however, notifiable under Class "B" in the Public Health Ordinance, and since the cases were locally contracted, investigations regarding the source and extent of infection have been begun.

Boys from two villages, El Goz and Rumeila, situated on the White Nile some two miles south of Khartoum, were examined and the former showed a 35% infection and the latter 60%.

The Director, Wellcome Tropical Research Laboratories has identified the mollusc *Bullinus truncata*, a carrier, in the canals from Shambat Farm and also this mollusc and *Planorbis boissyi* on the banks of the White Nile.

In view of the considerable importance of this disease both owing to its effect on the individual and the possibility of infecting canals in farms in this province and elsewhere, further investigations of its extent in the province will be carried out during the ensuing year.

### (18) VENEREAL DISEASES.

The appended tables showing the attendances at the various hospitals in the three towns call for no special comment; they give no indication of the prevalence of these diseases among the population.

The returns for the British Military Hospital are quoted separately as they are an accurate record of a known population under control.

Hospital.		Soft Sore.	Syphilis.	Gonorr.
Khartoum Civil Hospital	...	26	84	160
British Military	..	45	2	84
Khartoum North Dispensary	...	7	293	181
Omdurman Civil Hospital	...	—	86	69
Sudan Defence Force	... ..	—	13	—
		78	478	494

#### British Military Hospital.

	Local.	Imported.	Relapses.	Total.
Soft Sore	... 43	—	2	45
Syphilis	... 2	—	—	2
Gonorrhoea	... 62	5	17	84

Since the average number of troops throughout the period was 1,393, the total V. D. rate was 9.4% or 7.68% locally contracted.

### (19) OTHER COMMUNICABLE DISEASES.

Of the remaining communicable diseases notified, few comments need be made.

There was a mild outbreak of influenza associated with pneumonia during December 1925 and January 1926 and again in October, 1926.

Two cases of anterior poliomyelitis were notified from Khartoum Civil Hospital in March ; both recovered.

(20) **RABIES.**

An outbreak of rabies occurred in the Nuba Mountains and Kordofan Provinces during February and March which it was thought might spread westwards ; during this period eight cases of dog bite were reported in Khartoum, but in no one case was the animal infected. A campaign against uncontrolled dogs was carried out in the three towns resulting in the destruction of approximately 2,900.

(21) **VACCINATIONS.**

No case of small pox occurred in the province during the period under review. The annual vaccination tours of sanitary barbers were carried out throughout the province resulting in 7,574 vaccinations.

The following table shows the results obtained :—

	Successful	Failed	Unknown	Total
Khartoum Civil Hospital ...	1,371	163	—	1,534
British Military Hospital ...	35	75	—	110
Sudan Defence Force Hospital	95	81	—	176
Khartoum North Dispensary	525	64	390	979
Omdurman Civil Hospital	1,774	131	84	1,989
Rural District ... ..	—	—	2,786	2,786
Total ...	3,800	514	3,260	7,574



(22) STATEMENT OF BUILDING PETITIONS APPROVED UNDER THE TOWN BUILDING REGULATIONS, 1925.

During the period from October 1st, 1925 to December 31st, 1926.

	KHARTOUM					KHARTOUM NORTH			Omdurman
	1st Class Land	2nd Class Land	3rd Class Land	Total in Khartoum		2nd Class Land	3rd Class Land	Total in Khartoum North	
No. of Petitions for New Buildings ..	36	116	—	152		6	6	12	10
No. of Building Permits for Minor Alterations .. .. .	8	104	—	112		1	—	1	1
Total ..	44	220	—	264		7	6	13	11
Estimated Cost of New Buildings £E.	31669	35264	—	66933		5505	1410	6915	12813
Estimated Cost of work done under Minor Permits .. .. .	93.500	585	—	678.500		3	—	3	10
Total Estimated Cost of Buildings £E.	31762.500	35849	—	67611.500		5508	1410	6918	12823
No. of Notices Issued for Dilapidated Buildings .. .. .	—	74	—	74		—	1	1	1
No. of Contravention Notices Issued..	4	28	—	32		—	—	—	—
No. of Notices Issued for Removal Obstructions from Public Streets ..	8	28	—	36		—	—	—	—
Total No. of Notices Issued ..	12	130	—	142		—	1	1	1

(23) METEOROLOGICAL OBSERVATIONS AT KHARTOUM.

From October 1925 to December, 1926.

Month	MAXIMUM Temp. F.	MINIMUM Temp. F.	MONTHLY MEAN			RAIN M/M.
			MAXIMUM	MINIMUM	RELATIVE HUMIDITY	
October .. ..	109.0	64.2	103.8	75.6	32	Nil
November .. ..	105.2	58.0	95.8	68.6	38	„
December .. ..	97.4	57.0	90.6	64.4	38	„
January .. ..	96.8	50.9	85.1	54.8	31	Drops
February .. ..	100.4	51.2	89.2	59.4	22	„
March .. ..	110.4	50.7	94.4	63.5	17	Nil
April .. ..	111.0	58.4	102.8	70.7	10	Drops
May .. ..	115.7	76.8	109.6	81.6	28	„
June .. ..	114.8	74.8	108.5	81.2	34	„
July .. ..	108.8	67.1	102.4	78.2	49	74.6
August .. ..	108.3	72.5	102.4	79.7	57	1.0
September .. ..	109.4	72.5	103.1	79.4	39	10.7
October .. ..	107.8	70.8	102.6	75.6	26	2.3
November .. ..	100.6	55.4	86.8	65.1	26	Nil
December .. ..	99.6	57.2	90.4	62.0	32	„
						88.6

I am indebted to Mr. Joseph Hirst, the Meteorological observer for the above table, which he kindly supplied.



(24) CONSERVANCY.

The Conservancy systems in the three towns remain the same and are dealt with fully in the report of the Chief Sanitary Inspector.

A re-examination of the conservancy staff for intestinal parasites was carried out and shewed a marked decrease on the previous year; 25% of the men harboured pathogenic parasites against 62% last year; all those found infected have again been treated.

The report and recommendations of Mr. G. B. Kershaw M.I.C.E. on the installation of a water borne sewage system for Khartoum were received and considered by the Central Sanitary Board who made recommendations to the Central Government. It is to be hoped that this very important advancement towards the prevention of the spread of sewage-borne diseases in the capital town of the country will not be lost sight of and that it will be found possible to reserve funds to commence such an installation at no great distant date.

In connection with the Chief Sanitary Inspector's report it is of interest to note that adulteration of milk is practised to a far less extent in Omdurman than in Khartoum or Khartoum North, suggesting that the seller considers the European more gullible in these towns than his own brethren in Omdurman.

The present slaughtering ground in Khartoum is most unsatisfactory for a town of this type; plans and estimates for a cement and iron structure will be submitted at an early date. The method of meat transport is also extremely insanitary and this matter is being taken up with the District Commissioner with a view to obtaining a contractor using an all metal Ford or other motor transport.

In conclusion I wish to express my gratitude for the assistance always given to this Service by the District Commissioners of the three towns to whose keenness and energy in public health matters the general public owe a great deal.

Sd. J. C. N. HARRIS,  
M. D., CANTAB, D. P. H.,  
*Medical Officer of Health, Khartoum Province,*  
*Assistant Director, Sudan Medical Service.*

## ANNUAL REPORT OF CHIEF SANITARY INSPECTOR

FOR PERIOD 1ST OCTOBER 1925 TO 31ST DECEMBER 1926.

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### (1) STAFF.

A British sanitary inspector has now been permanently posted for duty in the rural district of the Province and the various farms are now receiving attention.

Several transfers and changes have taken place in the native staff, and this is likely to continue as the arrangement with the Medical Service for the training of sanitary overseers for the provinces is working smoothly. Already fourteen men have been trained and sent to the various outstations.

### (2) CONSERVANCY.

Labour during the period under review was plentiful but we are now almost entirely dependent on the extreme south-west provinces for our supply. Local labour for this class of work cannot be obtained now. The up country labourer may be divided into two classes—one who saves all he possibly can from his pay so that he may return to his home as quickly as possible, and the other who gets drunk on receipt of his wages. For the benefit of the former, and to stop, as far as possible, stealing amongst the men, a savings bank was commenced which has been appreciated by this section of the workers, and has also kept up the standard of labour obtained. In connection with the latter class, it is a case of continual weeding out, but the nights following pay day generally see a number of absentees.

However, on the whole, the manual part of the conservancy work has been carried out satisfactorily and very few complaints have been received.

The present double bucket system has been in operation for twenty years during which time the town has considerably expanded, and it is now becoming difficult to control.

The question of waste water disposal is also daily becoming more serious, and the present practice of throwing foul water on to the public thoroughfares and disposing on limited areas of ground attached to premises has given rise to nuisances on many occasions. Percolation pits have been allowed in some instances but this practice is not desirable.

On several occasions in the past the question of a sewerage scheme for Khartoum has been discussed but nothing material resulted.

Last year, G. Bertram Kershaw, Esqr., M.I.C.E. etc. visited Khartoum and drew up and submitted details of a water carriage scheme. His proposals are now under consideration. Such a scheme must materialise in the future, and it is to be hoped that, especially from a sanitary point of view, it will be tackled before the necessity of doing so is forced upon us.

Several months ago a survey was made of that part of the town where it was considered it might be advisable to carry out the first installation of a water carriage scheme for the city. The inspection included the entire eastern portion of the town, taking in the British Barracks, Fort and Railway premises, together with Block 1 West, the western blocks of A and B, and all



buildings in the western portion bounded by Khedive Avenue and the Embankment as far as the Zoo. The number of daily clearances carried out in this area was 1,812, the number of latrines 1,522, and the estimated number of sewer connections 569. The total number of clearances in the city is 3,594.

**Sewage Trenching Ground.** The refuse dump which is situated in the centre of the trenching ground for conservancy is gradually taking up so much land that it is now very difficult to work in a one year's rotation of pits for night soil, and it will therefore be necessary in the near future to take in additional ground.

**Public Latrines.** One new circular latrine with ten seats was erected in Omdurman. Repairs and painter work were carried out on all public latrines. The lighting of the public latrines in Khartoum has not been satisfactory owing to the electric lamps being repeatedly stolen. Iron guards were made to protect the lamps but these were forced and broken. The General Manager of the Sudan Light and Power Company Ltd. is taking the matter up with a view to altering the lighting arrangements.

**Conservancy Railway.** The track of the conservancy railway is now in good order and, with the exception of several switch points, should not require renewals for some years. The rolling stock has been thoroughly overhauled and is at present in good running order.

Another fourteen houses have been completed at the Deims for the use of the conservancy labourers, making twenty eight in all. These houses are much appreciated and greatly assist in the administration of the conservancy work. By the erection of the quarters most of the conservancy workers are now housed under good conditions instead of in the insanitary area at Block 6 K.W. It is necessary that the latter place be closed for human habitation as soon as possible, and new quarters be built for these workers who must necessarily live close to the Hamla.

**Scavenging and Refuse Disposal.** The cleanliness of the streets in Khartoum is not all that could be desired. This is particularly noticeable in the market and shop areas where, instead of cleaning up and depositing the rubbish in bins as requested, it is thrown on the streets and allowed to blow about. It is very difficult to catch the offenders as they are generally careful not to deposit the rubbish adjoining their own premises.

Attention has also been drawn in previous reports to the conditions prevailing in the city owing to the owners of certain properties taking in the footpath area while others adjoining have not. The result is the town is honeycombed with recesses which are either used as rubbish dumps or latrines. As long as these places are allowed to exist the general cleanliness of the town cannot be considered satisfactory.

There are now five of the new type four-wheeled refuse carts in daily use. There is no doubt as to their advantage over the old type of cart. The districts on which they are employed are much more expeditiously cleared, while the amount of refuse has almost doubled. Three other carts will be built shortly.

The amount of rubbish dealt with daily in Khartoum is approximately 27 tons, and 7 tons in Khartoum North.

The extra refuse carts were made in the workshops for use in Omdurman. The number is still inadequate for this town and additional carts and mules are required.

The main Khartoum loading station situated near Abbas Pasha Barracks has been entirely reconstructed. The mud brick enclosure has been entirely abolished and substituted by a structure composed of wire netting fixed to iron



uprights. This arrangement has greatly minimised the nuisance caused by waste paper and refuse being blown over the surrounding ground.

Owing to complaints, the small incinerator situated at the extreme south east part of the town was demolished, and the rubbish previously dealt with there is now taken direct to the main dump.

The incinerators at the Khartoum Deims, Burri and Khartoum North still continue to prove satisfactory for these districts. Several have been completely re-built and the others were repaired as required. Owing to the gradual expansion of the Khartoum Deims an extra incinerator will be required in the near future.

Wire netting enclosures have been constructed around all the incinerators at Khartoum North and a great improvement in the cleanliness of the surrounding ground has been effected.

123 of the new type of conical street refuse bin were built in the workshops, 50 of which were sent to El Obeid, 25 to Port Sudan, and the remainder were distributed in the three towns as follows:—Khartoum 24, Omdurman 18, and Khartoum North 6. Two large bins were built specially for use in the Khartoum markets.

### (3) WORKSHOPS.

**Blacksmith's Workshops.** The amount of new work or existing stock extensively renewed is as follows:—

Conservancy lorries	..	..	..	..	2
Conservancy trollies	..	..	..	..	6
Crowley carts	..	..	..	..	6
Conservancy washing tanks	..	..	..	..	12
Four wheeled all steel refuse carts	..	..	..	..	4
Refuse trollies	..	..	..	..	6
Public refuse bins	..	..	..	..	123
Axles	..	..	..	..	16
Brakes	..	..	..	..	6

The total number of general repairs carried out was 6,841, while the number of repairs to buckets and lids was 11,815.

72 new hub bushes were cast for wheels of refuse carts and conservancy lorries.

**Carpenter's Shop.** In the carpenter's workshop 4 new box refuse carts were made, while 613 general repairs were executed.

**Saddler's Shop.** 21 new sets of camel harness, and 30 sets of mule harness were made, while 3,491 repairs were carried out.

**Fly Prevention.** More attention has been given to the systematic clearance of stable manure throughout Khartoum, and an endeavour was made to carry out this work at least twice weekly at all stables. The provision of cement concrete platforms is being enforced and has so far met with a satisfactory response, and is greatly minimising the breeding out of flies.

House-to-house inspections have been regularly carried out and numerous notices served for accumulations of rubbish and dirty premises.

During the period October 1924 to September 1925, 2,964 zibla permits were issued, in Khartoum, and Khartoum North. For the period January to December 1926 the figures are—2,680; 1,386 and 1,294 respectively. Thirty-two prosecutions were instituted for contraventions.



Although the issuing of these permits assists in controlling the fly problem to some extent, there is no doubt that so long as this mixture, which forms one of the principal sources of fly breeding is used for the protection of mud walls, roofs, etc., one cannot expect any material improvement in this direction.

#### (4) **ANTI-MOSQUITO WORK.**

The total amount expended on anti-mosquito work in the Province for the twelve months ending 30th September 1925 was £E. 1,152.000 m/ms. i.e., £E. 982.000 m/ms. for labour, and £E. 170.000 m/ms. for larvicides. For the twelve months ending 31st December 1926 the figures are: £E. 1,153.000 m/ms., £E. 991.000 m/ms. and £E. 162,000 m/ms. respectively.

For the two periods under review the total infections found were 7,169 and 4,332, of which 3,137 and 1953 were found in Khartoum and district, and 1,847 and 1,089 in Khartoum North and district, and 2,185 and 1,290 in Omdurman and district respectively. Of the total infections given 897 and 219 were eggs and 82 and 143 were in the pupal stage, of which Khartoum area gave 649 and 703 egg rafts—Khartoum North area 190 and 54, and Omdurman 58 and 56. The pupal infections for the three towns for the two periods are, Khartoum 33 and 119, Khartoum North 23 and 2, Omdurman 26 and 22 respectively.

**Tuti Khor.** As in previous years the khor between Tuti and Khartoum North required considerable attention owing to the formation of pools due to the falling river. Drainage had to be carried out on a large scale by having two large drains cut—one running in a north westerly direction to the Main Nile with its outlet near the north end of Tuti, while the other discharged into the Blue Nile opposite Khartoum. These drains effectively carried off the subsoil water from Tuti Island and also the numerous pools from the bed of the khor.

In April and May of 1926 we had a very anxious time with this khor, also with the large sandbank which formed opposite the Moghren, owing to the periodical release of water from the reservoir at the Sennar Dam. When the releases took place, there was a sudden and considerable rise in the river. On one particular occasion the rise was so great that it flooded the whole of the native cultivation at both places mentioned, and it was only by prompt attention being given that a breed out of mosquitoes on an extensive scale was obviated.

**Sunt Forest.** Considerable trouble was again experienced at the Sunt Forest due to the high Nile, and it was only by daily concentration and strict supervision that a very serious breed out of mosquitoes was averted. Earlier in the year the Forestry Department had the branches of a large number of the trees cut to enable the mosquito men to gain access for inspection. Instead of clearing away the branches they were left on the ground. Pools of water formed under them, and a squad of about twenty men was employed in clearing them on to dry ground. Fortunately we again had a light rainy season which enabled us to give this place the necessary attention, but even then many infections reached the pupal stage before we could effectively deal with them, and on occasion, a modified breed out may have taken place. Should we at any time experience a heavy rainy season, the consequences which will arise from this place will undoubtedly be serious. To be brief, I am thoroughly convinced that as long as this forest exists we are harbouring trouble.

**Mineral Water Factories, Bakeries, etc.** No new mineral water factories were opened in the three towns, but application has been received for another in Khartoum which should be opened at the beginning of the year. Only one now remains in Omdurman and none exist in Khartoum North. Two prosecutions took place for contravention of the regulations requiring the sale of minerals in clear bottles. Otherwise these factories have been conducted satisfactorily.



Another depot for the sale of ice was opened. Both places are up to the required standard.

The total number of bakeries in the three towns is 93. They are distributed as follows:— Khartoum, 19 of the European type, and 14 of the Native type. Khartoum North 2 European, 8 Native, Omdurman 5 European and 45 Native. Regular and systematic inspections of these premises have been carried out and a higher standard of construction and cleanliness has been obtained, particularly in the Native bakeries.

Restaurants, native eating houses and coffee shops have received particular attention and a distinct all round improvement is noticeable.

#### (5) **MARKETS.**

The markets were regularly inspected and they have generally been kept in a satisfactory condition.

Funds have been allotted for improving the fish and offal markets in Khartoum which badly require attention. When the work is completed it will be much easier to control these markets, and keep them in a better sanitary condition.

New markets for butchers and fish sellers are about to be commenced at Khartoum North, and funds have also been approved for the wiring in of the Omdurman meat market.

During the period October 1924 to September 1925—695 lbs. of unsound food were destroyed, and 2,205 lbs. were destroyed from January to December 1926.

#### (6) **MILK VENDORS.**

Up to the present registration of milk vendors and numbering of their vessels and measures has only been adopted in Khartoum and Khartoum North. It is, however, hoped that in the near future Omdurman will be brought into line.

There are 142 registered milk vendors in Khartoum, and in Khartoum North there are 36.

For the period January to December 1926 228 samples were taken as follows :---

Khartoum 100, Khartoum North 51, and Omdurman 77. Twenty, or 20 per cent., of the samples taken in Khartoum were below standard, and the average presumed extent of adulteration 10.6 per cent. added water. The Khartoum North figures are nine, or 17.64 per cent., below standard and a percentage of 7.1 added water, while the Omdurman figures show that seven, or 9.1 per cent., were below standard with a percentage of 7.7 added water.

During the period under review proceedings were instituted in 33 cases of adulteration. In cases where the milk was slightly below standard the offenders were warned. Several persons were also prosecuted for selling milk without licences.

The usual weekly inspection of all registered milk vessels has been carried out.



**(7) NUISANCES.**

In Khartoum and Khartoum North 3,739 nuisances were dealt with during the period October 1924 to September 1925, i.e., Khartoum 2,712 and Khartoum North 1,027. The figures for the year 1926 are 3,573, 2,644, and 893 ; respectively. Apart from these figures a large number of nuisances were dealt with verbally.

**(8) PROSECUTIONS.**

Legal proceedings were instituted in 406 cases during the period October 1924 to September 1925, and the fines amounted to £E. 124.50 m/ms. The figures for the year 1926 are 558 and £E. 142.050 m/ms, respectively.

**(9) DOG DESTRUCTION.**

In consequence of an outbreak of rabies in Kordofan Province, an extensive campaign was launched in Khartoum, Khartoum North and Omdurman against stray dogs and between April and November 1926, 2,933 dogs were destroyed.

**(10) BORROW PITS AND DISUSED WELLS.**

During the period under review 51 pits and disused wells on streets and other Government land in Omdurman have been filled in. The amount of filling in material utilized was approximately 6,000 cubic metres.

These pits and old wells are usually used as latrines by the general public and, in the rainy season they form favourable breeding grounds for mosquitoes. It is only by filling in that these nuisances can be overcome, and it is to be hoped that special funds will be allotted annually until this useful work is completed.

**(11) SLAUGHTER PLACE.**

Conditions are not all that could be desired at the slaughter place. Owing to the expansion of Khartoum, more animals are being slaughtered daily, and consequently it becomes more difficult to keep the ground clean and in a satisfactory condition.

I think the time has now arrived when a departure should be made from the present method of slaughtering on the ground.

I suggest, as an experiment, the laying of one or two cement concrete platforms, the surface of which should be graded towards a centre channel which should be made to discharge the blood and washings into a cement pit situated at the end of each platforms. A water supply should also be laid on for washing down purposes. Iron should replace the present woodwork. The structure should have no roof, and need not be elaborate. By daily washing, the nuisance caused by flies and offensive odours would be reduced to a minimum.

**(12) INSANITARY PREMISES.**

During the period 18 premises in various parts of Khartoum were closed as being unfit for human habitation. In almost every instance unauthorized buildings, etc., had been erected, and rooms, never intended to be occupied as living quarters were being used as such. All the premises were leased on the "Farmed-out" principle, and exorbitant rents were being demanded.

A survey is now being made of the town with a view to ascertaining the number of insanitary and dilapidated premises and they will be dealt with in due course.

**(13) GENERAL.**

The Sanitary Inspectors' office at Omdurman was altered and extended, and electric current was installed.

Extra office accommodation is to be provided in Khartoum and a new forage store built.

(Sgd.) H. A. BOYLE,  
Chief Sanitary Inspector.

## QUARANTINE.

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### (1) WADI-HALFA QUARANTINE.

The quarantine season lasted from the beginning of September till the end of January, and the figures given refer to this period.

A Syrian medical officer was stationed at Wadi-Halfa especially for this work, and he was assisted by the Syrian medical officer in charge of the Wadi-Halfa civil hospital, who was able to devote a great deal of his time to the quarantine work.

A Medical Inspector was also stationed at Wadi-Halfa during the busiest time, from November 26th, 1926, to December 20th, 1926.

Two native laboratory assistants were employed to examine urine and faeces under the direction of the medical officer.

During this time 6,379 labourers passed through the quarantine.

254 were rejected, and repatriated. Of these, 60 rejections were on account of visible blood in the urine.

**Bilharzia.** Of the remainder 1,065 (17.4%) had blood in the urine, and 1,076 (17.6%) had bilharzia ova. 806 of the bilharzia cases were detained at Wadi-Halfa until cured, and then sent on to their destinations.

The remaining 270 were allowed to proceed to their destinations to be treated there.

In order to prevent the irrigated area of the Gezirah from being infected with bilharzia by Egyptian labourers, all labourers destined for this area who were found to be infected with bilharzia were either rejected or detained and treated at Wadi-Halfa. 806 labourers were treated at Wadi-Halfa, and as this measure involved a treatment period of 30 days a great additional strain was thrown on the quarantine staff.

**Ankylostoma.** 1,406 (22.9%) were found to be suffering from ankylostoma, and were treated.

The following list shows the number of cases under treatment for bilharzia at the 1st and 15th of the various months:—

Month	No. of cases
1st November, 1926	24
15th „ „	269
1st December, „	290
15th „ „	340
1st January, 1927	337
15th „ „	34
1st February, „	34



The following are the numbers and destinations of labourers who were passed through the quarantine:—

Date of arrival	No. of men	Rejected	Passed	Destination
25. 9.26	300	—	300	S. G. R. & S. Kassala
6.11.26	223	2	221	Kassala Cotton Co.
20.11.26	375	51	324	Hassa-Heissa
23.11.26	403	35	368	Hassa-Heissa
26.11.26	473	82	391	Hassa-Heissa
29.11.26	100	—	100	Hag Abdullah
29.11.26	518	3	515	Hassa-Heissa
1.12.26	603	4	599	Barakat
5.12.26	598	4	594	S. G. R. & S. Kassala
8.12.26	602	6	596	S. G. R. & S. Kassala
13.12.26	463	17	446	Hassa-Heissa
13.12.26	106	4	102	Barakat
17.12.26	641	19	622	Abu-Usher
24.12.26	431	10	421	Barakat
27.12.26	319	9	310	Abu-Usher
9. 1.27	224	8	216	Hassa-Heissa
	6,379	254	6,125	

The following table gives the number and percentage of labourers affected with certain symptoms and infestations:—

No. of men	Spleen	Haematuria	Bilharzia ova	Oxyuris	Ankylos-toma	Ascaris	Taenia
6,379	9	1,066	1,077	1,381	1,406	338	237
	0.15%	17%	17%	22%	22%	5%	4%

The following table gives the numbers of rejections from varying causes:—

Under age	...	...	...	...	...	7
Old age	...	...	...	...	...	20
Heart disease	...	...	...	...	...	3
Inguinal hernia	...	...	...	...	...	3
Blindness	...	...	...	...	...	9
Favus ...	...	...	...	...	...	18
Syphilis	...	...	...	...	...	1
Visible blood	...	...	...	...	...	60
Indiscipline	...	...	...	...	...	4
Refused treatment or other causes	...	...	...	...	...	129

The following was the staff employed :—

**Permanent** :—Two laboratory men  
One fitter  
One chief ghaffir.

**Temporary** :— 21 ghaffirs and workmen  
One cook.

## (2) PORT SUDAN QUARANTINE.

The figures for the quarantine are :—

	1923-4	1924-5	Oct. Dec. 1925	1926
Ships entering ... ..	650	792	186	820
Sambuks ... ..	589	395	140	393
H. M. Ships ... ..	10	22	9	20
Ships put in quarantine...	—	—	—	1
Total receipts .. .. £E.	953	£E. 1189	£E. 245	£E. 1098

One case of bubonic plague was isolated, having been landed from a ship arrived from Bombay.

A new human quarantine building has been completed.

## (3) SUAKIN QUARANTINE.

The port and pilgrim quarantine service at Suakin remained under the control of the International Quarantine Board of Egypt during the year 1926.

**Pilgrim Quarantine.** The pilgrimage was declared uninfected. 1,559 pilgrims received vaccination against small-pox and cholera before leaving Suakin for the Hedjaz.

3,948 pilgrims passed through the Suakin quarantine on the return journey.

Thus the number of pilgrims returning by Suakin was more than double the number of those leaving by that route. This is due to the fact that many pilgrims leave for the Hedjaz by the Massowah route and return by the Suakin route.

This deflection of the pilgrim stream from Suakin to the Massowah route is a matter of the last few years and is due to :—

- (i) The increase of the quarantine fees by the International Quarantine Board in 1922.
- (ii) The fact that all pilgrims have to leave Suakin in approved steamers and not in sambuks.
- (iii) The increase of steamer charges for transport of pilgrims.

Many of the West African pilgrims were unable to pay these increased charges and so tried the Massowah route and since then each year an increasing stream of pilgrims has been leaving by this route.

The attraction to the pilgrims of the Massowah route is mainly cheapness, but other considerations have some weight.

The reasons briefly are :—

- (i) From Massowah they are allowed to travel by sambuks (sailing boats) which is much cheaper than steamer transport. They may suffer the greatest hardship by the former mode of travel, but this is a secondary consideration with West African pilgrims.



- (ii) At Suakin there are strict regulations limiting the number of pilgrims that may be carried by each steamer; this while ensuring the comfort of the pilgrims increases the cost of transport.
- (iii) At Suakin pilgrims have to pay a deposit sufficient to meet their quarantine charges in the Hedjaz and on their return to the Sudan, and to provide them with a small sum on leaving the quarantine to maintain them until they can find work. At Massowah no such deposit has to be paid.
- (iv) At Massowah they escape vaccination against small-pox and cholera; an omission much appreciated by the pilgrims.

The disadvantages to the Sudan of a large body of pilgrims returning to Suakin who did not leave by that port are :—

- (i) A large number of pilgrims arrive who have not been vaccinated either against small-pox or cholera. This constitutes a serious danger to the Sudan.
- (ii) A large number of pilgrims have to be maintained in quarantine at Suakin at the expense of the Government as having left by Massowah they have paid no deposit for this purpose. This incurs a heavy expense to the Government.

792 of the pilgrims who were vaccinated against small-pox were re-examined on their return to ascertain the proportion of successful vaccinations.

The results of this examination are shewn in the following list :—

	No. of pilgrims vaccinated at Suakin.	No. of pilgrims vaccinated elsewhere.	Total
Positive ... ..	348	199	547
Negative ... ..	173	72	245
Total ...	521	271	792

No epidemic occurred in the course of the pilgrimage.

The administration of the port and pilgrim quarantine at Suakin was handed over to the Sudan Medical Service on 1st January, 1927.

## TRAINING.

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### (1) SUBORDINATE MEDICAL STAFF.

An increased effort was made to train additional subordinate medical staff:—

- (i) To meet the need created by the extension of irrigated areas on the Gezirah and at Kassala.
- (ii) To staff newly-opened dispensaries.
- (iii) To carry on endemic disease work and in particular work directed against bilharziasis and yaws.

This effort has involved a further heavy drain on the time and energy of the medical staff of the provincial hospitals.

In the course of 1926 seven dispensary hakims were passed out and appointed to various dispensaries; 16 sanitary hakims were passed out and appointed to smaller dispensaries or to endemic disease centres; and 11 dispensary hakims and 33 sanitary hakims were appointed for training.

Thus we now have a total of 50 dispensary hakims and 37 sanitary hakims at work at dispensaries or endemic disease centres.

Four additional laboratory assistants were trained for work in provincial hospitals by the Director, Wellcome Tropical Research Laboratories.

### (2) MIDWIFERY TRAINING SCHOOL.

The work of this school continues to make steady progress.

There are now 65 trained midwives at work. They are distributed as follows:—

Khartoum Province	...	...	...	...	34
Dongola	,,	...	...	...	6
Kordofan	,,	...	...	...	5
Blue Nile	,,	...	...	...	5
Berber	,,	...	...	...	7
White Nile	,,	...	...	...	8

During the matron's tour in 1925 through the White Nile, Blue Nile and Kordofan Provinces, 12 women were selected for training; these completed their training and passed the necessary examination at the end of June. With the exception of two young women who wished to be trained as nurses at the Omdurman Nurses Training School, they have all returned to their villages to practise.

**Tours of Inspection.** In November and December 1926 the matron made a tour of inspection through the Blue Nile, Dongola, Berber and Kassala Provinces. Seven women were selected from Dongola Province, two from Berber Province, three from Sennar merkaz and two from Omdurman.

Two young women were also selected in Dongola Province to be trained as nurses at the Omdurman Nurses Training School.

During her tours of inspection the matron inspects the work of the untrained midwives who are practising throughout the province, and issues or renews their licences to practise, if a certain low standard of proficiency is maintained. This licensing facilitates inspection and enables some slight



control to be maintained over their practice; but as the work of the trained women from Omdurman becomes better known the younger generation of mothers are foregoing the old untrained midwives with their barbarous methods and are employing the midwives trained in the Omdurman Midwifery School.

267 midwifery cases were delivered by the pupil midwives during their six months' training.

**Historical.** This midwifery training work was commenced by the present matron in 1921. At that time the midwifery practice of the Sudan was entirely in the hands of untrained midwives who as a class are very conservative, completely ignorant, and extremely dirty. The profession of midwife was to a considerable extent a hereditary one; the women were often very old and in some cases almost blind.

The matron in starting this work had very strong prejudices to work against. The women of the Sudan even more than the men are extremely conservative and resent any innovation which is not in accordance with their customs. Moreover the midwives themselves were very much against any change which would demand of them a higher standard of performance and a special training.

It is the custom in the Sudan for delivery to be carried out in a semi-standing position the woman supporting herself by a rope suspended from the ceiling and the midwife squatting between her legs to receive the baby. The introduction of any other method of delivery was looked on with the greatest suspicion.

At first the matron experienced the greatest difficulty in persuading any of the midwives to come forward for training and still more to persuade any expectant mothers to consent to be delivered in the European way.

Eventually in 1921 a class of midwives was got together. Some of them were old and some were infirm, but it was a beginning. A wife of an important religious leader was delivered in the European manner with eminently satisfactory results and following on this beginning a steadily increasing number of mothers were found willing to be delivered by the pupil midwives and in the European way. As the newly-trained midwives became available a higher standard was demanded of the untrained midwives and the old and the infirm were invited to send their daughters to be trained so that they could practise in their stead.

By 1924 it had been found possible to retain or replace by newly-trained women all the old midwives previously practising at Omdurman and Khartoum.

It was accordingly decided to start training women from the provinces, and to effect this it was arranged that the matron should do an annual tour in the provinces so as to get in touch with the wives of provincial notables to interest them in the work and to obtain young women of a good type to undergo a course of training at the Omdurman Midwifery School and then to return to practise in their own villages. To enable the matron to carry out this work in the provinces a single course of six months was substituted for the two four months' courses which had been carried out up to this time, thus leaving the matron two full months for her annual tour in the provinces.

This programme was adopted with very satisfactory results. Not only were young women obtained for training from the various northern and central provinces of the Sudan, but the way was paved by conversations and demonstrations for the adoption of the new method when the trained midwives returned to their provinces. The conservative influences in these outlying districts were in some cases very strong and great opposition to the work of



the trained midwives was encountered, but this opposition has gradually decreased and the newer methods are becoming increasingly popular.

At the present moment there are 34 trained midwives practising in Khartoum and Omdurman and 31 practising in the provinces.

The midwives thus trained become in a minor way missionaries in the homes of the people, in the cause of cleanliness and simple hygiene, and it is to their growing number and increasing influence that we must look not only to establish a standard of simple hygiene in the home, but also to combat the almost universal custom of complete female circumcision which is so barbarous in its execution, and which is fraught with so much danger both to mother and child. It may be many years before this custom is effectually checked, but in the meanwhile the first seeds of a silent revolution to cleanliness and hygiene are being sown in the homes of the people.

### (3) NURSES TRAINING SCHOOL, OMDURMAN.

Up to the present time although it has been possible to train efficient and trustworthy male attendants and even by giving a special intensified training to the best of them, to fit these for work in isolated dispensaries, it has not been possible to obtain suitable reliable female attendants and the hospitals throughout the country are very badly staffed on the female side.

In certain cases the position of chief female attendant has been entrusted to one of the midwives trained at the Omdurman Midwifery School, but although this has been an improvement, yet these midwives have not been trained for this purpose and in consequence in this respect fall short of the standard required.

There are great difficulties to be encountered in obtaining and training a suitable type of nurse:—

- (i) The women of the Sudan with the exception of a few girls who are being trained as teachers are quite illiterate.
- (ii) The nursing profession is at present looked on as a menial one by the people and it is difficult to persuade women of a good class to undergo this training.
- (iii) Except in exceptional circumstances it is useless to attempt to train unmarried girls as they will inevitably marry on the first opportunity.
- (iv) The custom and training of the better class Sudanese girls is against any quick movement. She moves and acts with exaggerated slowness and deliberation. This is a minor matter, but it is a serious drawback to efficiency and the habit is difficult to overcome.

As regards (i) This difficulty is being met by selecting the most suitable women that can be found and giving them instruction in reading and writing during their course of training.

(ii) This difficulty can be got over to some extent by the Matron's personal influence: it is necessary to select the best type possible and gradually work to a higher standard.

(iii) This difficulty is best met by selecting young, but mature women of good character who for some reason have been divorced or who have divorced their husbands. Such women, having had experience of married life and met with a certain degree of disillusionment, may be prepared to embrace a profession that offers regular employment and an adequate subsistence. If in addition such women are reliable and intelligent and have the ability to learn they may become useful nurses.



Up to the present, great difficulty has been experienced in finding the right type of women with the necessary intelligence and in keeping them when found, but similar difficulties were encountered in starting the Midwives Training School and in persuading any midwives of any sort to come forward for training, and yet it has been possible by patience and by accepting small things and steadily working to a higher standard to achieve a great measure of success. It is reasonable to hope, therefore, that with similar patience and persistence it will be possible in a few years' time to turn out well trained trustworthy nurses to staff our hospitals in various parts of the Sudan at first partially and later completely.

The completion of a good hospital for women at Omdurman in 1925 rendered it possible to make a commencement with the organised training of a native female nursing staff.

This side of the training work is at present only in an experimental stage, but it is earnestly hoped that it will prove successful.

Ten probationers were taken on towards the end of 1925, and six during 1926.

Of these, 8 came from Omdurman, 1 from Khartoum and the other 7 (3 of whom had already been trained as midwives at the Omdurman Midwifery Training School) from the provinces,

Their ages vary from 14 to 52; 3 are unmarried, 4 are married and 9 are divorced.

Of these 16, 5 could read and write, and 8 are receiving instruction in reading and writing. Two were rejected as being unable to learn to read, and one as being too young. The others are reported as making good progress.

By the end of 1927, 9 nurses should have completed their course of training, and, if they pass out satisfactorily, will be available for work in the provincial hospitals.

#### (4) THE SCHOOL OF MEDICINE.

The progress made at the school in 1926 was very satisfactory. The work of this year will be fully reported on together with the year 1927 in a separate two yearly report to be published early in 1928.

In the meanwhile a few notes of the work are included in this report.

**Number and constitution of classes.** At the end of 1925 it was decided not to admit a fresh class of students in the year 1926 because :—

- (a) the staff who had been carrying out the teaching work in addition to their ordinary duties had also had to plan and map out their scheme of teaching and syllabi of studies and it was felt that a breathing space was necessary.
- (b) only four really suitable candidates were at that time forthcoming, and in view of the considerations referred to above it was not considered justifiable to open a class for those students. This shortage of applicants is not likely to recur and a first year class of ten carefully selected students will be taken on at the beginning of 1927. From then onwards it is hoped to admit a similar number annually.

Thus two classes were held during 1926, a second year class of six students and a third year class of eight students. The third year class had commenced in 1924 as a class of ten students of whom one was referred back to the new



first year class of 1925 as a result of the examination at the end of 1924. He has since done extremely well. Another in view of his work and the examination at the end of 1925, was reported on as unsuitable for further medical training. Work was found for him elsewhere. Thus eight remain of the original first class of ten.

The second year class had commenced in 1925 as a class of eight.

As a result of a year's work and the examinations held at the end of 1925 two of these students were found to be below the standard necessary for the pursuance of the medical course and work was found for them elsewhere.

Thus at the beginning of 1926 the unsuitable students had been carefully weeded out from these two classes which were thus composed of students who were likely to complete their course satisfactorily.

#### **Course of Studies :—**

(a) **Second Year.** The second year students received the same course of instruction in Anatomy, Physiology and Histology as had been undertaken in the previous year by the senior class. The small size of the class made it possible to give the students individual attention, and progress was good.

The school year was divided as before into two terms of 15 weeks each, with a long vacation of three and half months. At the commencement of the second term an intermediate examination was held by the teaching staff to ascertain how much of the first term teaching had been absorbed and to ensure that careful reading had been carried out during the vacation.

(b) **Third Year.** The third year students began their professional work at the civil hospital and attended at the School of Medicine for lectures in Medicine, Surgery, Pathology and Public Health.

For their clinical work they were divided into two sections:—

No. (1) section became dressers on the surgical side and No. (2) section became clinical clerks on the medical side.

At the end of six weeks the two sections changed about. In addition all students attended the outpatient department and received instruction in the clinical laboratory and the post-mortem room.

**Vacation work.** Four of the third year students took their leave during the first half of the vacation while the other four remained in residence at the hostel and continued their work at the hospital. During the second half of the vacation those who had remained on duty took their holiday and the four who had taken their leave returned to work at the hospital.

**The Annual Examinations.** Examinations were carried out on completion of the year's work. These examinations were conducted by persons with expert knowledge of the subjects, but who had not been concerned with the teaching. In order to obtain a skilled outside opinion as to the standard of knowledge and proficiency attained and its relationship to the needs of the country and to the standard maintained in other schools, it was decided to invite an assessor to visit Khartoum to supervise, assist in and report on the examinations. For this purpose Mr. Robert Dolbey, M.S., F.R.C.S., F.A.C.S., who was for several years Professor of Surgery at the Kasr-el Aini Hospital in Cairo and who was also examining at that hospital was invited to undertake this work.

The examination consisted of a systematic written practical and aural examination of the second year students who had completed their studies in Anatomy and Physiology, and an intermediate informal examination of the third year students who would complete their period of professional training at the end of the next year.



The assessor in his report comments favourably on the type and physique as well as the intellectual qualities of the students. He notes that they show "great aptitude in the skilled and proper use of their hands in Anatomy and "Surgery." Speaking of the second year class he says "such is the advantage of "a small number of students, and of the daily, almost hourly, personal touch "and association between the Professors and Lecturers and their students, that "enough progress has been made in the year's instruction in Anatomy and "Physiology to bring the students up to the standard of the Conjoint Board "Examination in London. This of course, is only rendered possible by the "limited number of students in each year, and the consequent close contact "between them and their teachers".

The report which is generally of an encouraging nature will be embodied in the next School of Medicine two yearly report.

The senior class of students will complete their four years' course of study in December 1927 and will then enter for their final examination in the professional subjects and if successful will be granted diplomas entitling them to practise medicine in the Sudan only.

On the successful completion of their course of studies at Khartoum and and the receipt of this diploma to practise they will then for a further period of a year carry out the duties of a House Surgeon or House Physician at one of the larger provincial hospitals before being placed in charge of small hospitals or dispensaries.

**School Hostel.** Up to the of 1926 the students were lodged in a private house which was leased by the School for this purpose.

The accommodation thus provided was insufficient and unsuitable. A school hostel providing good accommodation for 40 students is almost completed and will come into use early in 1927 when ten additional students will have to be accommodated.

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## SUDAN MEDICAL SERVICE STAFF.

APPOINTMENT								ESTABLISHMENT
<b>Medical Staff :—</b>								
Director	...	...	...	...	...	...	...	1
Asst. Director (M. O. H., Khartoum Province)	...	...	...	...	...	...	...	1
Director, Khartoum Civil Hospital	...	...	...	...	...	...	...	1
Director, Omdurman Civil Hospital	...	...	...	...	...	...	...	1
Senior Medical Inspector	...	...	...	...	...	...	...	2
Medical Inspectors	...	...	...	...	...	...	...	18
Medical Officers (Syrians)	...	...	...	...	...	...	...	30
Asst. Medical Officers (Sudanese)	...	...	...	...	...	...	...	50
Sanitary Hakims (Sudanese)	...	...	...	...	...	...	...	37
Dispensers	...	...	...	...	...	...	...	6
Pathological Assistant	...	...	...	...	...	...	...	1
Laboratory Assistants (Sudanese)	...	...	...	...	...	...	...	8
<b>Nursing Staff :—</b>								
Matron, Khartoum Civil Hospital	...	...	...	...	...	...	...	1
Matron, Omdurman Civil Hospital	...	...	...	...	...	...	...	1
Matron, Midwives Training School	...	...	...	...	...	...	...	1
Nursing Sisters (Khartoum, Port Sudan and Wad Medani)	...	...	...	...	...	...	...	5
<b>Sanitary Staff :—</b>								
Chief Sanitary Inspector	...	...	...	...	...	...	...	1
Senior Sanitary Inspectors	...	...	...	...	...	...	...	2
Sanitary Inspectors	...	...	...	...	...	...	...	12
Sanitary Overseers (Sudanese)	...	...	...	...	...	...	...	10
<b>Clerical Staff :—</b>								
Superintendent	...	...	...	...	...	...	...	1
Clerks (British)	...	...	...	...	...	...	...	1
Translators (Grade VI)	...	...	...	...	...	...	...	4
Translators (Grade VII)	...	...	...	...	...	...	...	9
Translators (Grade VIII)	...	...	...	...	...	...	...	3
Clerks (Grade VII)	...	...	...	...	...	...	...	10
Clerks (Grade VIII)	...	...	...	...	...	...	...	9
Chief Accountant (Grade V)	...	...	...	...	...	...	...	1
Accountants (Grade VII)	...	...	...	...	...	...	...	6
Accountants (Grade VIII)	...	...	...	...	...	...	...	2
<b>Stores Staff :—</b>								
Medical Storekeepers	...	...	...	...	...	...	...	2
Asst. Medical Storekeeper	...	...	...	...	...	...	...	1
Storemen (Sudanese)	...	...	...	...	...	...	...	5
Tailors	...	...	...	...	...	...	...	2
Carpenter	...	...	...	...	...	...	...	1



## CHANGES IN PERSONNEL.

The following changes in personnel have occurred since my last report:—

### Medical Inspectors:—

Mr. D. S. Davies	...	...	Resigned	29.12.25.
Dr. N. F. Smith	...	...	„	1. 3.26.
Mr. S. A. T. Ware	...	...	Died	6.12.26.
Mr. C. E. G. Beveridge	...	...	Appointed	16.11.25.
Mr. J. A. Simons	...	...	„	17.11.25.
Mr. T. W. MacDowell	...	...	„	17.11.25.
Mr. R. C. Jones	...	...	„	20.12.25.
Mr. F. E. Anderson	...	...	„	17. 1.26.
Mr. F. S. Mayne	...	...	„	31. 1.26.
Mr. F. H. Goss	...	...	„	5. 3.26.
Mr. N. Macleod	...	...	„	29. 3.26.
Mr. D. R. Gawler	...	...	„	6. 4.26.
Dr. L. H. Henderson	...	...	„	11. 6.26.
Mr. J. S. Hovell	...	...	„	14.11.26.

### Medical Officers:—

Bimb. Mustafa Eff. Izzeddin	...	To pension	21.11.26.
Yusb. Nicola Eff. Haddad	...	To S. D. F.	16. 6.26.
Yusb. Yusef Eff. Salama	...	„	3. 7.26.
Dr. Mohamed Eff. Eid	...	Invalided	11. 5.26.
Dr. Tewfik Eff. Khoriat	...	Discharged	29. 1.26.
Dr. Magid Scander Eff. Khouri	...	Appointed	26.10.25.
Dr. Mohamed Eff. Nuwairy	...	„	2.11.25.
Dr. Rushdi Eff. Jabi	...	„	25. 1.26.
Dr. Ferid Eff. Meshaka	...	„	26. 2.26.
Dr. George Eff. El-Khouri	...	„	14. 6.26.
Dr. Giragos Eff. Cherukian	...	„	12. 7.26.
Dr. Sami Eff. Bishara	...	„	26. 7.26.
Dr. Avedis Eff. Injejikian	...	„	10.12.26.
Dr. Joseph Eff. Chacar	...	„	24.12.26.

### Sanitary Inspectors:—

Mr. G. Kerrison	...	...	{ Transferred to Khartoum Province	1. 3.26.
Mr. D. R. Walker	...	...	Invalided	13.11.26.
Mr. J. S. Vair	...	...	Appointed	7.12.25.
Mr. E. S. Duncan	...	...	„	15. 8.26.
Mr. J. C. Edwards	...	...	„	18.11.26.

### Dispensers:—

Yervant Eff. Nazarian	...	...	Resigned	30.10.26.
Zeki Eff. Zakai Djabi	...	...	Appointed	10.12.26.

Khartoum,  
4.4.1927.

(Sgd.) O. F. H. ATKEY,  
Director,  
Sudan Medical Service.

TABLE I.

Shows number of out-patients during 1926.

	Total.	%	Free.	%	On Payment.	%
Government Employees ...	198,526	23.8	194,043	23.3	4,483	0.5
School Children ... ..	90,310	10.8	90,233	10.8	77	—
Prisoners ... ..	56,845	6.8	56,845	6.8	—	—
All others ... ..	488,309	58.6	444,729	53.3	43,580	5.3
Grand Total ... ..	833,990	100	785,850	94.2	48,140	5.8

TABLE II.

Shows periods spent by classified officials on the sick  
list or on sick leave.

Nationality.	Total No. of days spent on sick list or on sick leave.
British ... ..	3,751
Other Europeans ... ..	612
Syrians and Egyptians ... ..	5,843
Sudanese ... ..	4,743
Total ... ..	14,949



TABLE III.

## Registration of births and deaths by Provinces, 1926.

PROVINCE.	BIRTHS.			STILL-BIRTHS			DEATHS.		
	Europeans.		Natives.	Europeans.		Natives.	Europeans.		Natives.
	M.	F.	M. F.	M.	F.	M. F.	M.	F.	M. F.
Khartoum	15	11	1,864 1,845	1	—	71 44	16	9	980 1,135
Halfa	—	—	736 708	—	—	8 13	—	—	456 467
Red Sea	8	5	150 133	—	—	15 2	8	4	278 208
Berber	4	2	2,195 1,983	—	—	32 20	1	—	1,472 1,480
Dongola	—	—	2,818 2,658	—	—	145 90	—	—	1,189 1,196
Kassala	—	—	900 743	—	—	29 41	2	—	655 459
Blue Nile	2	1	5,664 4,667	—	—	89 62	—	—	3,186 2,840
Fung	—	—	1,101 1,027	—	—	5 3	1	—	800 659
White Nile	—	—	2,475 2,178	—	—	78 52	—	—	1,169 877
Kordofan	1	—	4,534 3,715	—	—	44 28	1	—	1,799 1,437
Bahr-El-Ghazal	—	—	11 8	—	—	—	—	—	30 27
Upper Nile	1	—	54 46	—	—	4 1	—	—	34 25
Nuba Mountains	—	—	10 9	—	—	—	—	—	34 20
Mongalla	—	—	—	—	—	—	—	—	—
Darfur	—	—	100 105	—	—	5 4	—	—	330 274
Total	31	19	22,612 19,825	1	—	525 360	29	13	12,412 11,104
Total	50		42,437	1		885	42		23,516
Grand Total		42,487			886				23,558

% of still births to births = 2.08.

TABLE IV.

Shows the death rate per 1,000 births—Children under one year of age.

Province.								Births registered.	Deaths under one year.	Rate per 1,000
Khartoum	...	...	...	...	...	...	...	3,735	237	63.4
Halfa	...	...	...	...	...	...	...	1,444	199	137.8
Red Sea	...	...	...	...	...	...	...	296	88	297.3
Berber	...	...	...	...	...	...	...	4,184	311	74.3
Dongola	...	...	...	...	...	...	...	5,476	459	83.8
Kassala	...	...	...	...	...	...	...	1,643	137	83.4
Blue Nile	...	...	...	...	...	...	...	10,334	482	46.6
Fung	...	...	...	...	...	...	...	2,128	73	34.3
White Nile	...	...	...	...	...	...	...	4,653	131	28.2
Kordofan	...	...	...	...	...	...	...	8,250	138	16.7
Bahr el Ghazal	...	...	...	...	...	...	...	19	3	157.9
Upper Nile	...	...	...	...	...	...	...	101	7	69.3
Nuba Mountains	...	...	...	...	...	...	...	19	1	52.6
Mongalla	...	...	...	...	...	...	...	—	—	—
Darfur	...	...	...	...	...	...	...	205	24	117.1
Total								42,487	2,290	53.9



TABLE V.

Shows the admissions and deaths by disease.

DISEASE.	TOTAL.							
	Europeans.				Natives.			
	Male.		Female.		Male.		Female.	
	A.	D.	A.	D.	A.	D.	A.	D.
<b>Table "A"</b>								
<b>Tubercular</b>								
1. Disease of lung ... ..	—	—	1	—	147	27	26	5
2. All other tubercular diseases ...	1	—	—	—	140	11	56	1
<b>Venereal</b>								
3. Syphilis ... ..	7	—	—	—	995	5	329	2
4. Gonorrhoea ... ..	24	—	—	—	1,064	3	78	—
5. Soft Sore ... ..	2	—	—	—	36	—	—	—
<b>Eye.</b>								
6. Trachoma... ..	1	—	—	—	113	1	23	—
7. All other eye diseases ... ..	10	—	1	—	741	—	310	—
8. <b>Ear</b> ... ..	2	—	—	—	56	2	14	—
9. <b>Skin</b> ... ..	11	—	—	—	163	—	28	—
10. Wounds and other injuries ...	58	1	6	—	4,520	57	425	14
<b>Tumours.</b>								
11. Malignant ... ..	1	—	1	—	33	3	41	9
12. Non-Malignant ... ..	5	2	—	—	143	3	48	4
<b>Of Women.</b>								
13. Gynaecological ... ..	—	—	8	—	—	—	151	11
14. Confinements ... ..	—	—	23	—	—	—	98	6
15. <b>Poisoning</b> ... ..	—	—	1	—	7	4	3	—
Total Table "A" ...	122	3	41	—	8,158	116	1,630	52
<b>Table "B" (Tropical).</b>								
1. Ankylostomiasis ... ..	—	—	—	—	30	1	2	—
2. Bilharziasis ... ..	—	—	—	—	607	—	7	—
3. Blackwater Fever ... ..	—	—	—	—	9	3	—	—
4. Dysentery, Amoebic ... ..	17	—	3	—	465	14	58	4
5. Dysentery, Bacillary ... ..	19	—	5	—	237	5	10	—
6. Filariasis ... ..	—	—	—	—	3	—	1	—
7. Madura disease ... ..	—	—	—	—	153	—	30	—
8. Malaria ... ..	65	1	6	—	2,694	31	125	3
9. Leishmaniasis (Kala-Azar) ...	1	—	—	—	74	6	6	1
10. Trypanosomiasis... ..	—	—	—	—	—	—	—	—
11. Yaws ... ..	—	—	—	—	1	—	3	—
12. Sunstroke... ..	3	—	—	—	8	1	—	—
13. Heatstroke ... ..	2	—	1	1	1	—	—	—
14. Guinea Worm ... ..	—	—	—	—	57	—	1	—
Total Table "B" ...	107	1	15	1	4,339	61	243	8

TABLE V (Continued).

Disease.					TOTAL.							
					Europeans.				Natives.			
					Male.		Female.		Male.		Female.	
					A.	D.	A.	D.	A.	D.	A.	D.
Table " C " (Infective).												
1.	Anthrax	...	...	...	—	—	—	—	—	—	—	—
2.	Beri-Beri	...	...	...	—	—	—	—	—	—	—	—
3.	Cerebrospinal Meningitis	...			—	—	—	—	6	4	—	—
4.	Chicken Pox	...	...	...	1	—	—	—	551	—	18	—
5.	Cholera	...	...	...	—	—	—	—	—	—	—	—
6.	Dengue	...	...	...	1	—	—	—	—	—	—	—
7.	Diphtheria...	...	...	...	—	—	—	—	7	3	6	1
8.	Enteric (Including Paratyphoid)	...			2	—	2	1	51	8	16	3
9.	Erysipelas	...	...	...	1	—	—	—	2	—	2	—
10.	Gastro-enteritis of children	...			—	—	—	—	3	—	—	—
11.	German Measles	...	...	...	—	—	—	—	—	—	—	—
12.	Influenza	...	...	...	35	1	3	—	747	2	21	—
13.	Leprosy	...	...	...	—	—	—	—	22	2	1	—
14.	Malta Fever	...	...	...	—	—	—	—	10	1	—	—
15.	Measles	...	...	...	—	—	—	—	74	—	4	—
16.	Mumps	...	...	...	—	—	—	—	47	—	—	—
17.	Pellagra	...	...	...	—	—	—	—	—	—	—	—
18.	Puerperal Fever	...	...	...	—	—	—	—	—	—	12	3
19.	Phlebotomus	...	...	...	7	—	—	—	87	—	—	—
20.	Plague	...	...	...	—	—	—	—	—	—	—	—
21.	Pneumonia (Epidemic)	...	...	...	1	—	—	—	143	38	13	4
22.	Rabies	...	...	...	—	—	—	—	1	1	1	—
23.	Relapsing Fever	...	...	...	—	—	—	—	2	—	—	—
24.	Rheumatic Fever	...	...	...	1	—	—	—	39	—	2	—
25.	Scarlet Fever	...	...	...	—	—	—	—	—	—	—	—
26.	Tetanus	...	...	...	—	—	—	—	3	2	1	—
27.	Typhus	...	...	...	—	—	—	—	2	—	—	—
28.	Whooping Cough	...	...	...	—	—	—	—	1	—	1	—
29.	Small Pox	...	...	...	—	—	—	—	2	—	1	—
Total Table " C "					49	1	5	1	1,800	61	99	11
Table " D. "												
1.	Circulatory System	...	...	...	10	—	2	—	252	26	73	11
2.	Respiratory System	...	...	...	35	2	2	—	1,144	59	99	7
3.	Alimentary System	...	...	...	82	—	9	2	1,082	56	140	14
4.	Genito-Urinary System	...	...	...	10	—	—	—	499	22	49	3
5.	Nervous System	...	...	...	9	—	2	—	226	10	46	2
6.	Scurvy	...	...	...	—	—	—	—	22	2	—	—
7.	Diabetes	...	...	...	—	—	—	—	38	2	4	—
8.	Fever of uncertain origin	...			37	—	—	—	520	16	21	2
9.	All other diseases	...	...	...	49	—	4	—	572	26	92	2
Total Table " D "					232	2	19	2	4,355	219	524	41
" " " A "					122	3	41	—	8,158	116	1630	52
" " " B "					107	1	15	1	4,339	61	243	8
" " " C "					49	1	5	1	1,800	61	99	11
Grand Total					510	7	80	4	18,652	457	2,496	112



TABLE VI.

Shows births, deaths by ages and still births.

NATIONALITY.	Births.		Deaths by ages.							Total deaths.		Total still births.	
	Male.	Female.	Under 1	1-5	5-10	10-20	20-40	40-60	Over 60	Male	Female	Male	Female
British ...	5	3	—	1	—	1	8	4	—	11	3	—	—
Greek ...	15	11	5	1	—	—	5	10	1	13	9	—	—
Other Europeans .	10	6	—	—	—	—	1	2	1	3	1	—	—
Egyptians & Syrians	302	285	69	30	6	6	20	10	19	93	67	6	8
Natives of Sudan .	22,224	19,439	2,208	3,030	1,406	1,973	4,889	4,715	4,984	12,248	10,957	513	348
All others ...	85	102	13	12	6	16	57	33	16	101	52	7	4
Total ...	22,641	19,846	2,295	3,074	1,418	1,996	4,980	4,774	5,021	12,469	11,089	526	360
Grand total ...	42,487					23,558				23,558		886	
% deaths by ages..			9.7	13.0	6.0	8.4	21.1	20.2	21.3				

TABLE VII.  
Vaccinations performed during the year 1926.

PROVINCE.	Primary.			Re-vaccination.			Total.		
	Success.	Failed.	Unknown.	Success.	Failed.	Unknown.	Success.	Failed.	Unknown.
Khartoum	3,287	215	476	294	98	60	3,581	313	536
Halfa ...	788	12	9,579	3	—	—	791	12	9,579
Red Sea	1,148	381	1,724	—	51	190	1,148	432	1,914
Berber	5,587	1,757	488	846	58	200	6,433	1,815	688
Dongola	6,105	2,204	1,267	1,247	675	871	7,352	2,879	2,138
Kassala	1,036	211	12,573	19	—	—	1,055	211	12,573
Blue Nile	4,450	874	932	25	—	—	4,475	874	932
Fung ...	4,496	1,926	495	233	27	—	4,729	1,953	495
White Nile	1,619	789	4,497	480	362	39	2,099	1,151	4,536
Kordofan	3,689	1,555	1,011	—	—	—	3,689	1,555	1,011
Bahr-El-Ghazal	—	—	—	—	—	—	—	—	—
Upper Nile	479	259	891	—	—	—	479	259	891
Nuba Mountains	415	19	59	6	—	—	421	19	59
Mongalla	—	—	—	—	—	—	—	—	—
Darfur	—	—	—	—	—	—	—	—	—
Total ...	33,099	10,202	33,992	3,153	1,271	1,360	36,252	11,473	35,352

Total all vaccinations = 83,077.





TABLE IX.

Average daily constantly sick during 1926.

Hospital or Dispensary.	No. of beds equipped	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average daily through- out year
Khartoum	100	89.7	104.0	110.6	97.9	94.2	81.1	73.2	74.9	71.9	77.3	73.7	75.5	85.3
Omdurman	90	44.4	53.1	51.0	47.2	55.1	53.5	60.6	60.8	51.8	50.4	55.0	52.4	52.9
Atbara	79	54.2	71.3	73.5	61.6	53.5	50.8	62.9	68.3	65.4	62.3	71.6	68.5	63.7
Port Sudan	89	71.2	75.8	75.7	62.2	69.4	34.0	60.6	57.9	57.7	62.3	58.5	56.1	61.8
Suakin	17	3.7	3.3	4.6	4.0	4.9	1.8	5.0	8.2	5.4	4.5	4.1	4.4	4.5
Merowe	31	11.0	10.4	16.4	19.3	26.4	22.5	24.6	23.6	19.4	18.8	21.2	17.0	19.2
Dongola	21	7.8	8.4	10.4	9.9	15.9	13.3	14.8	8.5	12.4	11.1	9.4	10.6	11.1
Halfa	28	4.5	10.0	13.2	8.1	14.9	9.7	10.2	10.3	11.7	11.9	11.3	13.7	10.8
Dueim	38	13.6	14.8	9.1	4.6	9.6	3.3	9.4	7.9	7.7	6.4	10.6	9.7	8.9
Wad Medani	177	100.0	143.4	165.2	164.4	182.0	182.3	154.4	113.6	84.9	120.4	214.0	193.8	151.5
El Obeid	47	31.8	29.4	32.0	41.8	43.4	35.7	36.4	37.3	45.0	40.4	31.7	32.2	36.4
Nahud	36	27.2	29.4	28.3	21.4	21.2	19.7	17.6	14.7	20.4	16.7	23.2	25.7	22.1
Kassala	70	57.2	49.6	52.3	49.3	49.0	47.0	34.8	48.4	43.6	46.4	59.6	72.4	50.8
Gedaref	11	7.9	11.3	9.0	7.3	5.9	9.6	8.4	8.4	9.5	9.3	9.9	8.2	8.7
Makwar	113	60.9	74.6	85.0	83.0	77.0	64.8	53.0	51.3	56.4	78.9	75.6	81.0	70.1
Singa	30	19.2	21.7	21.0	25.0	22.4	24.8	19.4	17.7	17.7	19.0	22.7	14.7	20.4
Malakal	90	45.0	57.0	79.2	59.9	68.4	79.7	87.2	60.2	61.5	92.2	120.9	153.6	80.4
Kosti	18	20.4	17.0	18.0	16.0	17.9	20.4	18.3	15.6	14.7	13.8	15.7	14.1	16.8
Khartoum North	12	6.8	7.8	10.7	10.0	9.1	7.6	10.2	11.0	10.4	10.0	9.9	10.9	9.5
Abu Hamad	6	4.9	4.9	5.2	4.6	3.5	4.5	2.7	3.8	4.0	6.0	3.4	4.0	4.3
Derudeb	4	4.0	—2	—	—1	—1	—1	1.9	5.2	2.7	2.6	1.6	1.2	1.6
Port Sudan Prison	12	5.3	4.9	3.6	2.1	4.9	4.6	6.5	9.5	7.5	6.5	8.0	6.7	5.8
Khartoum North Prison	30	10.4	4.3	10.0	7.1	7.6	8.3	12.9	12.2	12.0	6.0	9.0	13.0	9.4
Talodi	16	7.5	3.0	5.0	3.4	7.2	4.5	4.4	4.9	3.4	3.7	3.4	3.3	4.5
Mefaza	3	—	1.9	3.4	3.6	3.0	—	—	1.7	1.5	—4	1.4	1.2	1.5
Bara	14	5.4	4.4	6.6	15.2	18.2	4.9	5.9	4.9	7.0	4.9	5.9	4.6	7.3
Kurmuk	2	2.1	2.4	—7	4.2	1.0	2.0	2.0	2.7	2.5	1.7	2.3	1.4	2.1
Dilling	12	—	—	—	18.0	14.7	13.2	15.7	12.4	13.2	15.1	12.7	20.0	11.2
Total No. of beds.	1,196	716.1	818.3	899.7	851.2	900.4	803.7	813.0	755.9	721.3	799.0	946.3	969.9	832.9
Average daily all hospitals	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average daily throughout year, all hospitals = 832.9.



TABLE X.

RETURN OF CIVILIANS TREATED IN MILITARY HOSPITALS IN THE SUDAN  
FROM JANUARY 1st, 1926 TO DECEMBER 31st, 1926.

Hospital			In-patients.		Out-patients.		Remarks.
			1925.	1926.	1925.	1926.	
Shendi	...	...	69	75	4,919	6,388	Closed Sept. 1926
Rumbek	...	...	431	382	10,284	6,374	
Roseires	...	...	65	94	2,451	2,310	Closed Oct. 1926
Bara	...	...	136	183	4,315	2,913	
Rejaf	...	...	56	307	1,384	11,644	
Dilling	...	...	180	112	3,514	7,472	
Mongalla	...	...	459	389	7,913	9,410	
Torit	...	...	345	694	8,455	15,942	
Wau	...	...	437	674	12,845	11,773	
Gallabat	...	...	49	41	637	1,007	
Raga	...	...	103	160	4,506	3,777	
Akobo	...	...	17	17	4,334	4,396	
El Fasher	...	...	415	535	4,474	5,492	
Aweil	...	...	281	181	4,619	4,539	
Nimule	...	...	25	38	7,087	8,052	
Geneina	...	...	69	212	1,692	2,927	
Yambio	...	...	56	155	8,534	20,202	
Kajo-Kaji	...	...	547	480	14,743	20,181	
Yei	...	...	519	672	3,261	10,802	
Kadugli	...	...	37	5	907	424	
Tembura	...	...	232	504	12,868	22,797	
Kebkebia	...	...	—	—	—	—	
Nyala	...	...	122	103	907	3,189	
Ikotos	...	...	68	283	301	8,847	
Total	...	...	4,718	6,296	124,958	190,818	

TABLE XI.  
Shows Medical Boards and Examinations held from 1.10.25. to 31.12.26.

PLACE	Sick Leave		Service South		Invaliding		Pensionable Service		Permanent Service		Temporary Service		Check Examina- tion	Assessment of Age	Grand Total
	Reed.	Not Reed.	Fit	Unfit	Reed.	Not Reed.	Fit	Unfit	Fit	Unfit	Fit	Unfit			
Khartoum ...	14	—	37	19	90	22	139	42	330	48	123	24	125	12	1,025
Omdurman ...	—	—	—	—	4	—	—	—	1	—	—	—	—	—	5
Khartoum North	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Atbara ...	5	—	4	1	54	13	34	19	43	8	5	1	44	2	233
Shendi... ..	—	—	2	—	—	—	—	—	—	—	—	—	—	—	2
Port Sudan	19	—	3	4	47	4	37	19	—	2	19	—	9	3	193
Sinkat ...	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1
Suakin ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Wad Medani	6	—	1	—	29	6	30	11	25	10	10	—	18	4	150
Makwar ...	—	—	2	1	11	—	5	2	14	—	2	—	4	—	41
Merowe ...	—	—	1	—	2	1	4	3	2	—	—	—	—	—	13
Dongola ...	—	—	—	—	1	—	1	1	1	—	—	—	—	—	4
Singa ...	—	—	—	—	—	—	4	—	1	—	—	—	—	—	5
Roseires ...	—	—	—	—	—	—	—	1	1	—	—	—	—	—	2
Malakal ...	1	—	—	1	2	—	8	—	4	—	—	—	—	—	16
El Obeid ...	1	—	—	5	1	3	5	4	4	2	5	—	—	—	30
Um Ruaba...	—	—	—	—	1	—	1	—	—	—	—	—	—	—	2
Nahud ...	—	—	—	—	—	—	1	—	—	—	—	—	—	—	2
Wadi Halfa	1	—	—	—	1	—	2	3	3	—	3	1	2	1	15
Kassala ...	—	—	7	4	1	—	7	3	4	—	—	—	2	—	28
Gedaref ...	—	—	—	—	2	—	5	—	3	—	—	—	—	3	13
Fasher ...	2	—	—	—	4	—	3	—	3	—	—	—	—	—	12
Nyala ...	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1
Geneina ...	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1
Talodi ...	—	—	—	—	—	—	1	—	1	—	—	—	1	—	3
El Dueim ...	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1
Wau ...	—	—	—	—	—	—	2	—	1	—	—	—	—	—	3
Mongalla ...	—	—	—	—	—	—	—	—	3	—	—	—	—	—	3
Nasser... ..	—	—	—	—	—	—	—	1	—	—	—	—	—	—	1
Aweil ...	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1
Bor ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Egypt *	111	4	—	—	—	—	—	—	13	—	1	—	—	—	248
Syria *	7	2	—	—	7	—	—	—	23	—	111	2	—	—	33
Greece ...	9	—	—	—	—	—	—	—	—	—	1	—	—	—	9
Nairobi ...	—	—	—	—	—	—	—	—	1	—	—	—	—	—	1
Aden ...	2	—	—	—	—	—	—	—	1	—	—	—	—	—	3
Italy ...	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1
London*	63	23	1	1	—	—	—	—	214	—	—	—	—	—	302
TOTAL ...	242	29	59	36	257	49	293	109	724	70	282	28	203	25	2,406

\* By Sudan Government representatives.



HOSPITAL OR DISPENSARY.	In-patients.		Hospital Charges.		Out-patients.		Sale of Medicines.		Total Receipts.		Operations.	
	1925	1926	1925.	1926.	1925.	1926.	1925.	1926.	1925.	1926.	1925.	1926.
			£E. m/ms.	£E. m/ms.			£E. m/ms.	£E. m/ms.	£E. m/ms.	£E. m/ms.		
Khartoum	1,775	2,440	1,239.019	1,632.663	29,640	40,124	497.565	430.855	1,736.584	2,063.518	407	466
Omdurman	1,094	1,267	541.070	734.372	27,026	49,258	490.990	485.920	1,032.060	1,220.292	135	224
Atbara	1,869	2,212	817.875	667.289	18,127	38,800	376.624	361.421	1,194.499	1,028.710	167	201
Port Sudan	1,295	2,110	1,444.189	1,476.932	20,806	41,270	646.864	637.342	2,091.053	2,114.274	165	329
Suakin...	202	126	105.340	21.267	6,838	10,134	135.275	27.515	240.615	48.782	63	7
Merowe	401	476	118.206	149.690	14,444	30,308	183.346	123.789	301.552	273.479	69	101
Dongola	276	280	105.520	79.224	11,371	23,401	57.488	57.732	163.008	132.956	88	79
Halfa ...	480	499	180.689	954.196	17,279	30,116	126.995	76.312	307.684	1,030.508	71	73
Duem...	186	151	245.095	110.297	9,596	12,921	268.982	117.257	514.077	227.554	16	14
Wad Medani	3,116	3,264	1,897.188	1,632.286	12,174	12,911	577.135	482.398	2,474.323	2,114.684	226	146
El Obeid	575	801	327.723	460.136	22,895	40,249	543.242	509.296	870.965	969.432	155	178
Nahud...	343	693	136.360	250.784	9,732	11,007	221.337	262.548	357.697	513.332	23	63
Kassala	1,098	1,391	634.960	493.911	13,512	26,191	376.485	347.815	1,011.445	841.726	115	329
Gedaref	219	272	68.496	79.867	5,906	10,370	101.785	94.925	170.281	174.792	14	32
Makwar	2,480	1,361	—	284.646	31,522	5,266	—	97.653	—	382.299	390	330
Singa ...	407	588	158.800	179.648	5,801	11,373	47.817	73.920	206.617	253.568	7	32
Malakal	773	1,279	142.895	204.399	35,112	20,287	521.226	220.990	664.121	425.389	412	372
Kosti ...	501	651	109.862	121.238	5,809	7,350	200.610	169.823	310.472	291.061	—	3
Khartoum North	540	493	63.692	90.010	12,941	21,486	202.666	213.476	266.358	303.486	6	13
Abu Hamad	108	126	20.233	13.717	4,356	11,389	25.635	12.761	45.868	26.478	3	2
Derudeb	298	199	—	—	4,501	5,905	—	1.200	—	1.200	—	—
Port Sudan Prison	221	172	—	—	3,832	7,066	—	—	—	—	10	12
Khartoum North Prison	380	272	—	—	7,933	9,610	—	—	—	—	13	9
Talodi...	—	117	—	—	4,378	9,978	—	1.800	—	1.800	3	2
Kurmuk	—	58	—	—	1,323	4,710	3.830	24.525	3.830	24.525	—	—
Mefaza	—	39	—	—	491	2,777	—	5.285	—	5.285	—	—
Bara ...	—	236	—	—	3,452	4,104	—	—	—	—	2	—
Dilling	—	165	—	—	—	15,807	—	—	—	—	—	4
Abri ...	—	—	—	—	1,474	5,001	—	.200	—	.200	—	—
Debba...	—	—	—	—	3,071	7,511	—	2.250	—	2.250	—	—
Gebel Aulia	—	—	—	—	5,169	6,173	—	—	—	—	—	—
Nuri ...	—	—	—	—	4,305	17,688	—	—	—	—	—	—
Roseires	—	—	—	—	436	—	—	—	—	—	—	—
Rejaf ...	—	—	—	—	1,430	—	—	—	—	—	—	—
Um Ruaba	—	—	—	—	8,248	9,169	—	—	—	—	—	—
Argo ...	—	—	—	—	10,355	13,584	—	—	—	—	1	—
Berber...	—	—	—	—	4,947	15,154	78.740	24.550	78.740	24.550	—	—
Damer...	—	—	—	—	3,999	6,804	—	—	—	—	—	—
Sinkat	—	—	—	—	3,743	5,199	33.145	25.400	33.145	25.400	—	—
Sennar	—	—	—	—	2,892	477	—	—	—	—	—	—
Zeidab...	—	—	—	—	2,653	2,627	—	—	—	—	—	—
Gambeila	—	—	—	—	3,020	1,321	58.860	41.815	58.860	41.815	—	—
Kareima	—	—	—	—	6,561	15,146	19.305	14.480	19.305	14.480	—	—
Hag Abdalla	—	—	—	—	3,345	2,607	—	3.450	—	3.450	—	—
Rashad	—	—	—	—	7,327	6,891	—	—	—	—	—	—
Khashm El Girba	—	—	—	—	1,752	—	—	—	—	—	—	—
Renk ...	—	—	—	—	2,908	7,315	—	1.050	—	1.050	—	—
Rufaa ...	—	—	—	—	296	5,732	—	—	—	—	—	—
Kamlin	—	—	—	—	2,597	4,481	—	5.780	—	5.780	—	—
Managil	—	—	—	—	—	1,181	—	—	—	—	—	—
Tokar ...	—	—	—	—	9,188	12,169	196.797	49.375	196.797	49.375	1	—
Delgo ...	—	—	—	—	328	3,130	—	—	—	—	—	—
Soderi	—	—	—	—	1,200	3,497	—	—	—	—	—	—
Wad Hamid	—	—	—	—	530	1,430	—	—	—	—	—	—
Lady Baker	—	—	—	—	2,862	5,741	—	—	—	—	—	—
Abu Zabad	—	—	—	—	3,605	12,102	—	—	—	—	—	—
Karkoj	—	—	—	—	3,670	5,659	—	—	—	—	—	—
Hadaliya	—	—	—	—	644	1,696	—	—	—	—	—	—
Goz Ragab	—	—	—	—	1,660	1,942	—	1.600	—	1.600	—	—
Gebett...	—	—	—	—	5,960	6,334	3.980	18.050	3.980	18.050	—	—
Gebett Mine	—	—	—	—	—	4,288	—	—	—	—	—	—
Kodok...	—	—	—	—	6,090	7,913	—	7.100	—	7.100	—	—
Gebelen	—	—	—	—	2,369	7,648	—	.200	—	.200	—	—
Rahad...	—	—	—	—	6,795	12,652	—	.850	—	.850	—	—
Magouda	—	—	—	—	1,413	2,502	—	.400	—	.400	—	—
Haiya ...	—	—	—	—	177	3,515	—	2.500	—	2.500	—	—
Abu Deleig	—	—	—	—	—	2,978	—	—	—	—	—	—
Aroma...	—	—	—	—	—	1,234	—	—	—	—	—	—
Muglad	—	—	—	—	—	3,803	—	—	—	—	—	—
Tendelti	—	—	—	—	—	2,586	—	—	—	—	—	—
Abwong	—	—	—	—	1,590	1,113	—	—	—	—	—	—
Abu Sheneina	—	—	—	—	—	1,294	—	—	—	—	—	—
Mekali...	—	—	—	—	—	3,827	—	1.100	—	1.100	—	—
Aba Island	—	—	—	—	—	5,804	—	—	—	—	—	—
Duk Faywil	—	—	—	—	—	1,913	—	3.600	—	3.600	—	—
Bor ...	—	—	—	—	—	1,561	—	6.400	—	6.400	—	—
Yoynyang	—	—	—	—	—	105	—	—	—	—	—	—
Hillet Nuer	—	—	—	—	343	4,921	—	—	—	—	—	—
Komor	—	—	—	—	—	374	—	—	—	—	—	—
Seleima	—	—	—	—	—	1,557	—	—	—	—	—	—
Hosh ...	—	—	—	—	—	1,317	—	—	—	—	—	—
Tayiba	—	—	—	—	—	982	—	—	—	—	—	—
Wad Naaman	—	—	—	—	—	460	—	—	—	—	—	—
Wad Saadala	—	—	—	—	—	395	—	—	—	—	—	—
Medina	—	—	—	—	—	496	—	—	—	—	—	—
Wad El Ataia	—	—	—	—	—	820	—	—	—	—	—	—
Wad Solfab	—	—	—	—	—	475	—	—	—	—	—	—
Tebub...	—	—	—	—	—	446	—	—	—	—	—	—
Derwish	—	—	—	—	—	258	—	—	—	—	—	—
Abdel Rahman	—	—	—	—	—	466	—	—	—	—	—	—
Ghubshan	—	—	—	—	—	684	—	—	—	—	—	—
Abdel Galil	—	—	—	—	—	382	—	—	—	—	—	—
El Radna	—	—	—	—	—	466	—	—	—	—	—	—
Abdel Hakam	—	—	—	—	—	403	—	—	—	—	—	—
El Remeitab	—	—	—	—	—	498	—	—	—	—	—	—
Hamad El Nil	—	—	—	—	—	467	—	—	—	—	—	—
Nidiana	—	—	—	—	—	498	—	—	—	—	—	—
Shendi...	—	—	—	—	—	5,513	—	—	—	—	—	—
Geili ...	—	—	—	—	—	1,744	—	—	—	—	—	—
Melut ...	—	—	—	—	—	368	—	—	—	—	—	—
El Seir	—	—	—	—	—	591	—	—	—	—	—	—
Sagadi...	—	—	—	—	—	—	—	—	—	—	—	—
W. Kordl. Trav. Hospital	—	—	—	—	2,340	—	—	—	—	—	—	—
E. "	—	—	—	—	—	18,612	—	—	—	—	—	—
Berber "	—	—	—	—	—	1,780	—	—	—	—	—	—
Berber "	—	—	—	—	—	20,400	—	—	—	—	—	—
Midwifery School	—	—	—	—	—	—	—	—	—	—	—	—
Headquarters	—	—	—	—	—	—	—	—	—	—	—	—
Quarantine	—	—	—	—	—	—	—	—	—	—	—	—
Stamped paper	—	—	—	—	—	—	—	—	—	—	—	—
Fines ...	—	—	—	—	—	—	—	—	—	—	—	—
Miscellaneous...	—	—	—	—	—	—	—	—	—	—	—	—
	18,637	21,738	8,357.212	9,636.572	470,697	833,990	6,403.033	5,174.396	15,949.503	16,152.238	2,565	3,027



TABLE XIII.

Statement of estimated expenditure during the year 1926 and Budgetary estimates  
for 1927.

Item.	1926. Actual Expenses £E.	1927. Budget Estimates £E.
<b>Personnel :—</b>		
1. HEADQUARTERS :—		
(a) Classified ... ..	12,760	13,524
(b) Unclassified ... ..	422	473
2. HOSPITALS :—		
(a) Classified ... ..	36,500	38,298
(b) Unclassified ... ..	8,165	8,670
3. QUARANTINE :—		
(a) Classified ... ..	1,548	2,484
(b) Unclassified ... ..	560	1,195
4. SLEEPING SICKNESS :—		
(a) Classified ... ..	8,098	8,964
(b) Unclassified ... ..	705	810
5. GEZIRA SCHEME :—		
(a) Classified ... ..	2,808	2,904
(b) Unclassified ... ..	3,600	3,749
6. BILHARZIA AND OPHTHALMIC TRAVELLING HOSPITALS :—		
(a) Classified ... ..	—	4,228
(b) Unclassified ... ..	—	3,606
<b>Allowances and Services :—</b>		
1. Headquarters ... ..	38,740	39,911
2. Hospitals ... ..	20,340	22,460
3. Quarantine ... ..	1,570	3,838
4. Sleeping Sickness ... ..	6,630	7,005
5. Gezira Scheme ... ..	6,890	7,420
6. Bilharzia and Ophthalmic Hospitals ... ..	—	5,945
	149,336	175,484
To be recovered from other sources ... ..	5,931	15,689
	143,405	159,795



TABLE XIV.

CHURCH MISSIONARY SOCIETY' HOSPITAL, OMDURMAN.

Diseases for which Patients Sought Treatment. From October 1st, 1925 to September 30th, 1926.

## 1.—GENERAL INFECTIOUS DISEASES.

a. Bacterial diseases.

1.	Cellulitis and Ulcers ...	...	...	...	...	...	...	...	130
2.	Tuberculosis—Phthisis	...	...	...	...	...	...	...	15
	Adenitis	...	...	...	...	...	...	...	50
	Caries of bone	...	...	...	...	...	...	...	23
	Joints	...	...	...	...	...	...	...	7
	Peritoneum	...	...	...	...	...	...	...	14
3.	Whooping Cough ...	...	...	...	...	...	...	...	5
4.	Leprosy ...	...	...	...	...	...	...	...	20
5.	Gonococcal infections	...	...	...	...	...	...	...	77
6.	Bacillary dysentery ...	...	...	...	...	...	...	...	1
	Mycosis—Mycetoma ...	...	...	...	...	...	...	...	36
	Spirochaetal infections								
	Syphilis—Congenital	...	...	...	...	...	...	...	27
	Primary	...	...	...	...	...	...	...	16
	Secondary	...	...	...	...	...	...	...	114
	Tertiary	...	...	...	...	...	...	...	17
	Protozoan infections								
1.	Malaria ...	...	...	...	...	...	...	...	67
2.	Amoebic dysentery ...	...	...	...	...	...	...	...	26
3.	Kala-Azar ...	...	...	...	...	...	...	...	—
	Diseases of Doubtful Aetiology								
1.	Measles ...	...	...	...	...	...	...	...	3
2.	Influenza ...	...	...	...	...	...	...	...	90

## 2.—DISEASES DUE TO METAZOAN PARASITES.

a.	Trematodes Schistosomiasis Bilharzia	...	...	...	...	...	...	4
b.	Cestodes & Nematodes Tape Worms and							
	Round Worms	...	...	...	...	...	...	20
	Ankylostomiasis	...	...	...	...	...	...	—

**3.—DISEASES OF METABOLISM.**—Diabetes ... .. 6

#### 4.—DISEASES OF ENDOCRINE GLANDS.

Thyroid enlargement	...	...	...	...	...	...	...	5
---------------------	-----	-----	-----	-----	-----	-----	-----	---

## 5.—DISEASES OF DIGESTIVE SYSTEM.

[illegible]





**17.—DISEASES OF THE EYE.**

a. Injuries	...	...	...	...	...	...	...	...	...	...	58
b. Conjunctival Diseases	...	...	...	...	...	...	...	...	...	...	700
c. Cornea, diseases of	...	...	...	...	...	...	...	...	...	...	—
d. Cataract	...	...	...	...	...	...	...	...	...	...	75
e. Glaucoma	...	...	...	...	...	...	...	...	...	...	39
f. Disease of the Fundus	...	...	...	...	...	...	...	...	...	...	8
g. Refraction, Errors of	...	...	...	...	...	...	...	...	...	...	125
h. Diseases of Iris and Media	...	...	...	...	...	...	...	...	...	...	—

**18.—INJURIES.**

a. General	...	...	...	...	...	...	...	...	...	...	246
b. Scorpion Stings	...	...	...	...	...	...	...	...	...	...	44
c. Bites by Snakes	...	...	...	...	...	...	...	...	...	...	—

**New patients : —**

Men	...	...	...	2016
Women	...	...	...	1819
Children	...	...	...	1594
			————	5429

**Admitted as in-patients.**

Men	...	...	...	343
Women & Children	...	...	...	406
			————	749

**Return visits (out-patients)** ... 18009

**Operations :—** Major ... 238  
 Minor ... 135  
 ——— 373

**N.B. Previous year :—**

New out-patients ... 6232  
 Return old out-patients ... 19194

**In-patients :—** Men ... 289  
 Women & Children ... 320  
 ——— 609





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„ Endemic	4
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„ Hydrocele	17
Epidemic diseases	1
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